SERVICE MANUAL

Centuri

MANUAL NO.
901-2165

AZTARAC©

AZTARAC
AZTARAC
AZTARAC©

AZTARAC

TABLE OF CONTENTS

I. GENERAL INFORMATION:

II. OPERATION:

III. GAME PARTS DRAWINGS- PARTS LIST & SCHEMATICS:

USER INFORMATION - F.C.C.

WARNING

THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY, AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. AS TEMPORARILY PERMITTED BY REGULATION, IT HAS NOT BEEN TESTED FOR COMPLIANCE PURSUANT TO SUBPART J OF PART 15 OF F.C.C. RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE, THE USER AT HIS OWN EXPENSE WILL BE RQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

INTRODUCTION

"AZTARAC" IS A MICROPROCESSOR BASED COIN-OPERATED ELECTRONIC GAME, THAT MAKES EXTENSIVE USE OF DIGITAL INTEGRATED CIRCUITRY AND TELEVISION MONITOR CONCEPTS. THIS MANUAL IS DESIGNED FOR THE USE OF MAINTENANCE TECHNICIANS WHO POSSESS A GENERAL KNOWLEDGE OF SOLID-STATE CIRCUITRY AND VIDEO MONITOR THEORY. ANY INDIVIDUAL NOT KNOWLEDGEABLE IN THESE AREAS SHOULD NOT ATTEMPT REPAIR OF THE ELECTRONIC PORTIONS OF THE GAME.

IN ADDITION TO THIS MANUAL AND TRAINING IN ELECTRONICS, TROUBLESHOOTING AND REPAIR WILL BE FACILITATED BY ACCESS TO GENERAL-TYPE HANDTOOLS, A MULTIMETER, A 50 OR 100 MHZ OSCILLOSCOPE AND A LOGIC PROBE WOULD BE HELPFUL.
TECHNICAL ASSISTANCE IS AVAILABLE BY CALLING (305) 558-5200. QUESTIONS OR COMMENTS CONCERNING "AZTARAC" OR ANY OF OUR GAMES ARE WELCOME AND SHOULD BE DIRECTED TO:

CENTURI, INC.
CUSTOMER SERVICE DEPARTMENT
#800-327-7710 (OUTSIDE THE STATE OF FLA.)

NOTES

NEVER REPLACE ANY COMPONENT WITH ANYTHING OTHER THAN THE EXACT REPLACEMENT PART.
NEVER REMOVE CIRCUIT BOARD CONNECTIONS WHILE POWER IS ON.
DO NOT REPLACE A FUSE WITH ANYTHING OTHER THAN THE PROPER VALUE. A BLOWN FUSE INDICATES AN OVERLOAD CONDITION WITHIN THE GAME. REPLACING A FUSE WITH A HIGHER VALUE CAN CAUSE SEVERE DAMAGE TO INTERNAL COMPONENTS IF AN OVERLOAD OCCURS.
ALWAYS CONSULT THE SERVICE MANUAL BEFORE ATTEMPTING REPAIRS..

AZTARAC
ATTRACT MODE

Upon power-up, the Aztarac game will pause for a second or so during the initial power-up RAM test (see below), and then enter the attract mode. The title page of the attract mode consists of a large circle with the name "Aztarac" written across it, expanding and contracting rhythmically while three groups of "electrons" whirl about it. A copyright message appears in a smaller white circle in the lower right of the display. The large circle containing the name of the game oscillates in size at a gradually increasing speed until it reaches a frantic rate, at which point it explodes.

As the explosion proceeds, a moving star field begins to fade in in the background. The explosion eventually scintillates away to invisibility while the star field comes up to full brightness, at which point the legend "4031 A.D." fades into view in large purple letters in the center of the screen. This then fades away, and, with the star field still moving past, a series of words begins to scroll past, saying: "A THOUSAND YEARS OF INTERSTELLAR PEACE HAS COME TO AN END."

At this point, a rotating yellow starbase composed of four pulsating diamonds enters the screen from the upper right and begins to move toward the lower left. When the starbase is about a third of the way down the screen, the scrolling words continue with: "TERRAN STARBASES ARE UNDER ATTACK BY ALIEN ROBOT DRONES" -- a phalanx of pulsating green drones comes into view here -- " FROM BEYOND THE SWAN NEBULA." The green drones eventually exit the screen to the lower left and the scrolling words sum up with: "YOUR MISSION AS STARSHIP COMMANDER IS:", and as these letters scroll off the top of the screen, the phrase "DEFEND THE STARBASES!" is hammered out, teletype-style, in flashing letters at screen center. Once this phrase has been typed out, it remains in place for a short time, flashing brightly in letters that grow and shrink in sync with their color pulsations, to emphasize to the viewer that this is the object of the game.

Now the display changes to a "condensing" starbase in preparation for a short sample of game play action. The player's ship is shown coming out of the center of the starbase and attacking a phalanx of drone ships toward the upper right. The phalanx is moving toward the starbase, and the player's ship is unable to destroy them all before some of them reach it, so one of the player's starbase "lobes" is destroyed, along with the remaining members of the phalanx. Then the player's ship moves off toward the lower left to successfully intercept and destroy another

phalanx, then to the upper left with the same result, and finally to the lower right with the same result once again. It then moves back into the center of the starbase and point values of 1000, 2500, and 5000 are shown for each of the three remaining starbase lobes, respectively. The effect of this sample play action sequence is to demonstrate most of the elementary aspects of the game: the smooth, fluid motion of the player's ship; the ability to rotate and shoot the laser in any direction, independent of the direction of motion of the ship; the fact that enemy ships move toward the base at all times, and that points are lost by allowing them to reach it; the fact that the enemy ships will shoot back under certain circumstances (it is left to the player to figure out what these circumstances are); and the necessity of returning to the center of the base when all enemy ships are gone in order to collect bonus points for each of the base lobes saved. Demonstrations of the radar and the use of pods are omitted, since these are intended to be of interest only to the more advanced player.

Now the screen displays the high-score page, showing the top three players' initials and scores under little "medallions" labelled GOLD, SILVER, and BRONZE. Large pulsating letters proclaim that these are the "ALL TIME CHAMPIONS", while three sets of arcs spin rapidly about the rim of the display, the medallions resonate, and the players' initials rhythmically throb. After several seconds of this, the display returns to the title page and the cycle repeats.

Throughout the above, the score(s) achieved in the preceding game (or, 0, at power-up) continue to be displayed in the upper left corner of the screen, and the previous power and energy indicators remain in view at the lower left and right, respectively. Either "INSERT COIN" or "FREE PLAY" appears in the upper right corner, depending on whether or not the game has been placed in free-play mode. At any time during the attract mode, an onlooker may hit the radar button to move directly to the high-score page, or may pull the joystick trigger to move directly to the point at which "DEFEND THE STARBASES" is hammered out.

Game Play

When a game credit is present and no game is currently underway, the display will show the words "WELCOME ABOARD COMMANDER" in shifting red/purple colors, along with a flashing red/yellow "PRESS START ONE" message. If more than one credit is present, the additional words "OR START TWO" will flash beneath this.

When the player presses START ONE, the unit displays a flashing "ATTENTION ALL UNITS" message, and, after a second or two of this, "STARBASE CAPRICORN UNDER ATTACK" appears, to the accompaniment of frantic beeping at various pitches. Then the display shows Starbase Capricorn "condensing" and the play begins.

The object of the game is simply to "defend the starbases", i.e., to prevent any of the alien robot drone ships from making contact with any of the starbase "lobes" (each of the four sections of a starbase is called a "lobe"). To accomplish this, the player may destroy the drones by shooting them or colliding with them, or he may find that certain drones cannot harm the starbase and may be let go. The play centers around preservation of the starbases, terminating when all four lobes of a given starbase are captured, so the player has unlimited "lives" and may allow his ship to be destroyed as much as he likes, as long as he preserves at least one base lobe under each "sign" or zone.

Points are awarded for each drone ship destroyed (see below for specific point values). Bonus points are also given for each base lobe left once all enemy ships are gone. The "Condition" field appearing at the upper right of the display indicates both whether or not any enemy ships remain and whether, if any do remain, they constitute a threat to the player's survival. Condition RED indicates that enemy ships exist and that the number of remaining phalanxes of them is sufficient to destroy all of the player's remaining base lobes if they are left unmolested. Condition YELLOW indicates that drone ships exist but that the number of phalanxes of them is less than the number of remaining base lobes, so that the player need not fear losing the game on the current round but may still destroy drone ships for more points if he so desires. Condition GREEN indicates that no more enemy ships exist -- from the moment when this condition goes into effect, the player has about 20 seconds to get back to the center of the starbase to collect his bonus points. 1000 points are awarded for the first base lobe preserved, 2500 for the second, and 5000 for the third. If all four lobes are preserved at a given stage, 20000 bonus points are awarded, along with a bonus power pod and a bonus energy pod, and the player skips a stage. This gives intermediate and advanced players both the incentive and the means to play quickly through the signs they have already mastered.

Each starbase up until Starbase Virgo has either a power pod or an energy pod orbitting it. These may be picked up by running the ship across them at any time. Picking up a power pod

increases the speed of the player's ship, while picking up an energy pod increases the rate at which it fires when the trigger is held on. Experienced players will always want to pick up these pods, since they hold the key to penetration of the later stages. Inexperienced players will ordinarily not pick them up, either because they cannot find them (the use of the radar is almost indispensible to this) or because they cannot yet handle the increased speed conferred by the power pods (the energy pods are always desirable, independent of skill level).

The radar may be used at any time to see over long distances. It works like a conventional WW2 radar, sweeping around in a circle and blipping at the appropriate distance from the center each time the beam sweeps across something. The rate of rotation of the radar beam is a function of the sign the player is under -- in Capricorn and Aquarius the beam is at its slowest; for Pisces, Aries, and Taurus it speeds up a little; in Gemini, Cancer, and Leo it is faster yet, and so on. Each time the player activates the radar the beam flips its direction of rotation -- this feature allows the beam to be swept back and forth rapidly over an object of interest as the player approaches it, so that when he gets close enough to it to see it directly he will be in position to deal with it appropriately. Everything except the stars shows up in the radar: the starbase lobes, the pods, and all enemy phalanxes. Turning on the radar interferes with neither moving nor shooting (for both the player and the drones!).

There are six different kinds of drone ships altogether, and ten basic phalanx formation shapes. Under the first sign, Capricorn, only the simplest of each appears, the so-called "Dumb" drone ships, in the "Very Small Rectangle" formation. Only four such phalanxes appear, and they all move in very slowly from initial positions very close to the starbase, making this starbase a very easy one to defend. One additional drone ship type and one additional phalanx formation type, more or less, is added in each subsequent sign, and the number and speeds of the phalanxes also increase gradually as the signs progress. The six drone ship types are as follows:

1. Type: Dumb
   Visual: Triangular, pulsating green (green radar blip)
   Arms: Ordinary projectiles, slow
   Tracking: Barrel straight forward, no response to player
   Points: 20

2. Type: Rocket
   Visual: Pentagonal, undulating orange (orange radar blip)
   Arms: Ordinary projectiles, medium speed
   Tracking: Forward 160 degrees, slow response
   Points: 35

3. Type: Nasty
   Visual: Octagonal, rotating blue/red (purple radar blip)
   Arms: Ordinary projectiles, fast
   Tracking: Full 360 degrees, fast response
   Points: 60

4. Type: Dumb Class II
   Visual: Triangular, pulsating purple (blue radar blip)
   Arms: Smart projectiles, slow
   Tracking: Barrel straight forward, no response to player
   Points: 25

5. Type: Rocket Class II
   Visual: Pentagonal, sparkling yellow (yellow radar blip)
   Arms: Smart projectiles, medium speed
   Tracking: Forward 160 degrees, fast response
   Points: 40

6. Type: Nasty Class II
   Visual: Octagonal, whirling yellow/blue (white radar blip)
   Arms: Smart projectiles, fast
   Tracking: Full 360 degrees, instantaneous response
   Points: 80

The nine phalanx types are as follows:

1. Very Small Rectangle, 3x4

2. Small Rectangle, 3x6

3. Rectangle, 4x8

4. Very Small Delta, a triangular formation with 10 ships in a bowling-pin-type pattern

5. Small Delta, like Very Small Delta except with a fifth row of 5 ships

6. Delta, a large V-shaped formation containing 30 ships

7. Glob, a 6x6 formation with missing corners

8. Glob Escort, 8 ships in a large circle

9. Dagger, a dagger-shaped formation of 32 ships

10. Dagger Kicker, a 2x4 rectangular kicker on the Dagger

The distribution of phalanxes by sign, then, is as follows:

1. Capricorn
   - 4 Very Small Rectangles of Dumb ships

2. Aquarius
   - 2 Very Small Rectangles of Dumb ships
   - 1 Very Small Delta of Dumb ships
   - 2 Very Small Deltas of Rocket ships

3. Pisces
   - 1 Small Rectangle of Dumb ships
   - 1 Very Small Delta of Rocket ships
   - 1 Very Small Rectangle of Rocket ships
   - 1 Small Rectangle of Rocket ships
   - 1 Very Small Delta of Nasty ships

4. Aries
   - 1 Small Delta of Dumb ships
   - 1 Small Rectangle of Rocket ships
   - 2 Small Deltas of Rocket ships
   - 2 Very Small Deltas of Nasty ships

5. Taurus
   - 1 Small Rectangle of Dumb ships
   - 1 Glob of Dumb ships, escorted by
   - 1 Glob Escort of Nasty ships
   - 1 Small Rectangle of Rocket ships
   - 1 Small Delta of Rocket ships
   - 1 Small Rectangle of Nasty ships
   - 1 Small Rectangle of Class II Dumb ships

6. Gemini
   - 1 Dagger of Dumb ships
   - 1 Dagger of Rocket ships
   - 1 Glob of Rocket ships, escorted by
   - 1 Glob Escort of Nasty ships
   - 1 Dagger of Nasty ships
   - 1 Small Rectangle of Class II Dumb ships
   - 1 Glob of Class II Dumb ships
   - 1 Small Rectangle of Class II Rocket ships

7. Cancer
   1 Dagger of Dumb ships, with
   1 Dagger Kicker of Class II Nasty ships
   1 Rectangle of Rocket ships
   1 Rectangle of Nasty ships
   1 Very Small Delta of Nasty ships, escorted by
   1 Glob Escort of Class II Rocket ships
   1 Dagger of Class II Dumb ships
   1 Small Delta of Class II Nasty ships

8. Leo
   1 Delta of Dumb ships
   1 Delta of Rocket ships
   2 Deltas of Nasty ships
   1 Delta of Class II Dumb ships
   1 Delta of Class II Rocket ships
   2 Deltas of Class II Nasty ships

9. Virgo
   1 Rectangle of Dumb Ships
   1 Delta of Dumb ships
   1 Dagger of Rocket ships
   1 Delta of Rocket ships, combined with
   1 Small Delta of Class II Nasty ships
   1 Very Small Rectangle of Nasty ships
   1 Rectangle of Class II Dumb ships
   1 Dagger of Class II Rocket ships, with
   1 Dagger Kicker of Nasty ships
   1 Dagger of Class II Nasty ships

10. Libra
   9 Globs of Nasty ships (all in a row!)

11. Scorpio
   1 Very Small Rectangle of Dumb ships
   1 Very Small Rectangle of Rocket ships
   1 Rectangle of Nasty ships
   1 Delta of Nasty ships, combined with
   1 Small Delta of Class II Nasty ships
   1 Delta of Class II Dumb ships
   1 Dagger of Class II Dumb ships
   1 Glob of Class II Rocket ships
   1 Dagger of Class II Rocket ships
   1 Rectangle of Class II Nasty ships

12. Sagittarius

1 Rectangle of Dumb ships
1 Glob of Dumb ships, escorted by
1 Glob Escort of Class II Nasty ships
1 Dagger of Rocket ships, with
1 Dagger Kicker of Class II Nasty ships
1 Delta of Nasty ships, combined with
1 Small Delta of Class II Nasty ships
1 Delta of Class II Rocket ships, combined with
1 Small Delta of Nasty ships
1 Dagger of Class II Nasty ships

DIAGNOSTICS

At the start of the power-up sequence, a RAM test is carried out so that any problems due to flaky RAM will be caught before using the RAM in any way. If the RAMs are working properly, execution proceeds through the rest of the initialization and ends up in the attract mode. Otherwise, control branches to a tight loop intended to be of help in diagnosing the RAM problem through the use of an oscilloscope. Thus, if the unit will not power-up, first check the RAMs to see that they are all in place and operational. If the problem persists, check the chip-select lines on the RAMs (those on both the CPU/sound and the XY board)-- if a steady pulsetrain in the neighborhood of 1 MHz appears on one of them, then this is the RAM that the CPU finds it cannot access properly. Otherwise the problem is someplace else. The instruction sequence the the CPU executes when it finds a bad RAM is:

```
LOOP    MOVE.B    D1,(A0)     ;WRITE TO BAD LOCATION
        MOVE.B    (A0),D2     ;READ BACK FROM IT
        BRA       LOOP        ;DO IT AGAIN
```

All other diagnostic functions are accessed through the use of the diagnostic switch located in the upper right corner of the Coin Door when it is open. When this switch is pressed during the play of a game, it puts the unit into "frame single-step mode", allowing the display to be frozen for picture-taking or diagnostic purposes. To single-step one frame while in this mode, simply press the START ONE button. As many frames as desired may be single-stepped in this way; to exit frame single-step mode, activate the diagnostic switch again.

When the diagnostic switch is activated from the attract mode, instead of putting the machine into frame single-step, it enters the diagnostics/selection sequence. The first two pages in this sequence are designed to permit the controls and switch inputs to be tested and the various gain and alignment potentiometers on the XY board and the Monitor to be adjusted, as detailed elsewhere in this manual. The third page, reached by activating the diagnostic switch twice more in succession, permits the various operator-selectable options to be set.

OPTIONAL SWITCH SETTINGS

1. AVERAGE PLAY TIME DESIRED

1:30	2:15	3:00
1:45	2:30	3:15
2:00	2:45	3:30

This option allows you to select the difficulty level of the game in the units most directly meaningful to you: average minutes per play. Rotate the Track Wheel (the turret-aim knob) until the time you desire is lit up yellow, and then pull the trigger on the joystick.

2. DIFFICULTY LEVEL TRACKING

AUTOMATIC MANUAL

This option allows you to set up the machine to automatically adjust its own difficulty level in accordance with your specified average play time, or to keep it at the fixed difficulty level corresponding to the average play time you have specified. You should always leave this setting in AUTOMATIC unless you have some specific need for a fixed, unchangable difficulty level (such as for tournament play, where all games must be at the same level).

3. COINS PER PLAY

FREE
1 2 3

This option allows you to select one, two, or three coins per play, or to put the machine into FREE play mode. Spin the Track Wheel until the desired setting is lit, and pull the trigger on the joystick.

4. FREE GAME IN SAGITTARIUS

YES NO

The machine is normally set up so that in the unlikely event that a player preserves one or more of the base lobes in SAGITTARIUS, the last sign, he gets a free game credit for each lobe preserved (the graphics for this starbase are little boxes saying "free game"). In certain localities it may be illegal for a video game to give free game credits, so this option allows you to disable this feature substituting instead merely a continuation of the current game back at Starbase Capricorn.

5. SOUND IN ATTRACT MODE

YES NO

In certain street locations it may be objectionable to have the unit making noise all the time. This option allows the sound effects to be enable or disable in the attract mode as desired.

6. RESET HIGH SCORES

LEAVE ALONE

RESET NOW!

The settings you select by means of the above sequence 1 thru 5 are permanent-- the unit contains an EAROM (Electrically Alterable Read-Only Memory) chip that saves your settings, along with high-score/initials information, as reliably as if you had selected them via DIP switches. Because the high score information, as well, is retained in this way, you may at times wish to reset these scores so as to remove profanity, spur competition, or what have you. This "option" (not really an option but a conditional command) allows you to do this, by turning the Track Wheel until "RESET NOW!" is lit, and then pulling the trigger.

At the end of this sequence it wraps around to the start again. It is good practice to review the whole set after you have made a change, to see that all of the settings are as you had intended, by simply pulling the trigger to step through the list while leaving the Track Wheel alone. When ready to put the unit back into normal operation, activate the diagnostic switch again, located on the coin door.

Note that if you spin the Track Wheel to make a change to a particular option, the change does NOT go into effect until you pull the trigger on the joystick-- spinning the wheel and then hitting the diagnostic switch will not save the new setting selected. Note also that you may enter this sequence at any time to examine your current settings without fear of altering them inadvertantly, as long as you do not spin the Track Wheel as you move through them.

INSTALLATION

YOUR GAME WAS SHIPPED FROM THE FACTORY IN READY-TO-PLAY CONDITION.
A BRIEF INSPECTION IS SUGGESTED BEFORE THE MACHINE IS REMOVED FROM THE CARTON. IF THERE IS DAMAGE TO THE SHIPPING CARTON, CONTACT THE FREIGHT CARRIER FOR CLAIM PURPOSES. EXTERNAL DAMAGE COULD INDICATE POSSIBLE DAMAGE TO THE CABINET AND/OR ELECTRONICS COMPONENTS.

AFTER THE CARTON HAS BEEN SATISFACTORILY INSPECTED, REMOVE THE MACHINE FROM THE SHIPPING CARTON.

EXAMINE THE INTERIOR OF THE GAME FOR DISCONNECTED WIRES, CABLES OR HARNESSES. MAKE SURE THE ELECTRONIC DEVICES ARE SECURELY MOUNTED IN THEIR SOCKETS, ETC. RECORD THE GAME SERIAL NUMBER, SINCE IT WILL BE REQUIRED FOR REFERENCE AND SERVICING.

ELECTRICAL REQUIREMENTS

UNLESS OTHERWISE SPECIFIED, THIS GAME IS SET TO OPERATE AT 110 VOLTS A.C. (REFER TO 110/220 VAC CONVERSION INSTRUCTIONS).
POWER SUPPLY CHASSIS SCHEMATIC INFORMATION AND PARTS LIST ARE INCLUDED IN THIS MANUAL.

110/220 VAC CONVERSION INSTRUCTIONS

THIS GAME CONTAINS A HARNESS CONFIGURATION WHICH ALLOWS THE MACHINE TO BE OPERATED FROM EITHER A 110 VAC OR 220 VAC, 50 Hz OR 60 Hz POWER SOURCE. ALL GAMES SHIPPED FROM CENTURI, INC., ARE IN THE 110 VAC CONFIGURATION. TO CHANGE TO THE 220 VAC CONFIGURATION FOLLOW THE PROCEDURE BELOW.

FIRST: UNPLUG THE MACHINE FROM THE WALL OUTLET TO COMPLETELY ELIMINATE SHOCK HAZARDS.

SECOND: REMOVE THE SINGLE 3 AMP SLOW-BLOW FUSE FOUND IN THE A.C. DISTRIBUTION BRACKET, AND INSTALL TWO, 1.5 AMP SLOW-BLOW FUSES. NEXT, CUT THE #18 AWG. WHITE JUMPER AT BOTH ENDS OF THE FUSE HOLDER AND REPLACE THE COVER.

THIRD: ON THE GAME POWER TRANSFORMER, LOCATE THE "ORANGE" JUMPER PLUG WHICH IS MARKED, 110 VAC. UNPLUG THE "ORANGE JUMPER, AND PLUG IN THE "RED" JUMPER PLUG MARKED 220 VAC.

TO REVERT BACK TO 110 VAC, REPLACE THE COMPONENTS ORIGINALLY REMOVED FROM THE PROCEDURE STEPS ABOVE.

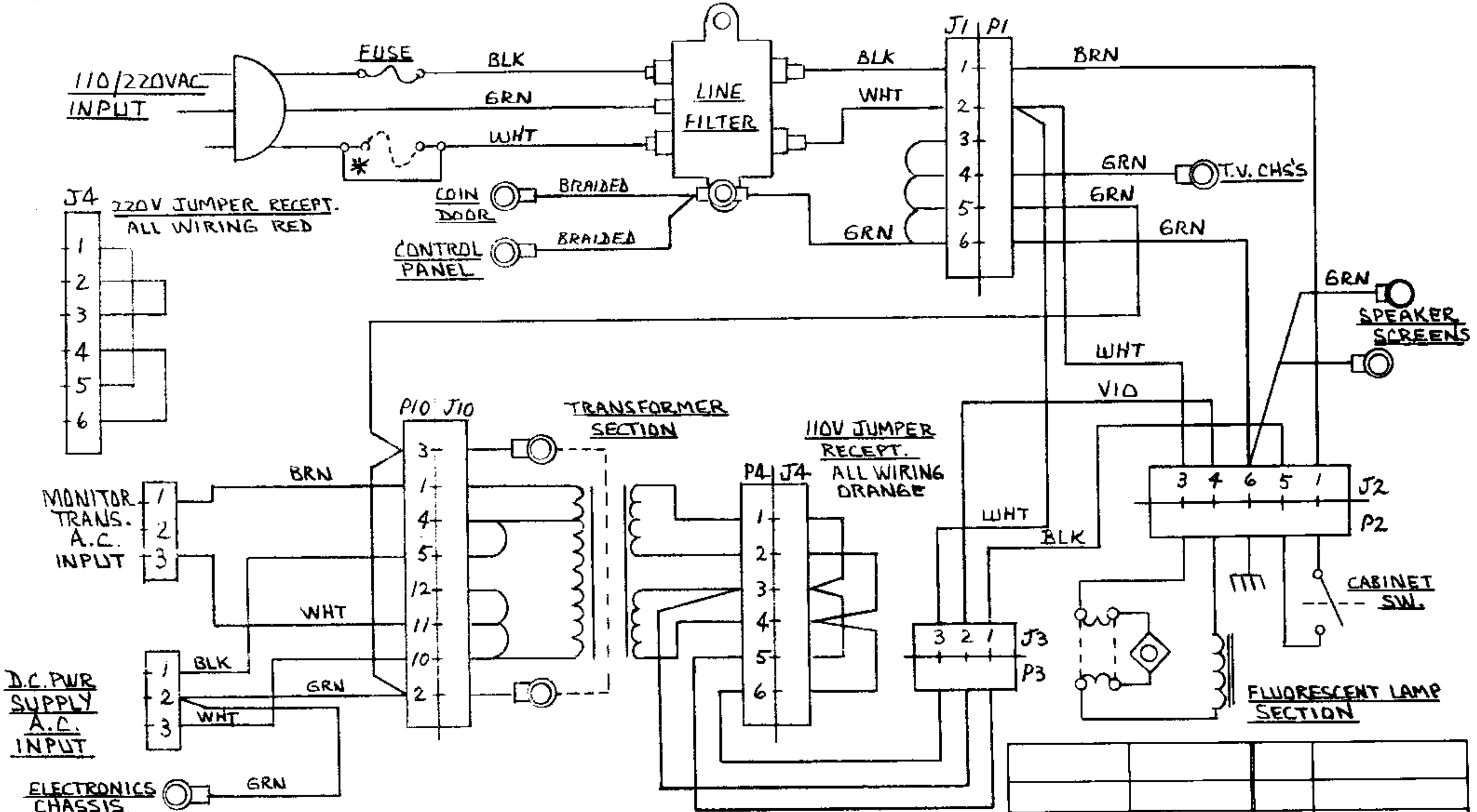
**NOTE: THE COMMON SIDE OF THE A.C. LINE MUST <u>NOT</u> BE FUSED IN THE 110 VAC CONFIGURATION, REPLACE THE #18 AWG. WHITE JUMPER WIRE.

(REFER ALSO TO THE 110/220 VAC POWER INTERCONNECT DIAGRAM)

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE EXPRESSED PERMISSION OF CENTURI, INC.

FIGURE-1

✱ SEE SERVICE MANUAL FOR 220 VAC CONVERSION



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

REV. LET.	ECN NO.	REVISION	BY

AF 17899A

TOLERANCES	
Unless Otherwise Specified	
FRACTIONS	± 1/32
DECIMALS 2 PL	± .015
DECIMALS 3 PL	± .005
HOLES	+ .003 − .001
ANGLES	± 1/2°
SHT. MET BENDS	+ 2°

centuri inc. HIALEAH, FLORIDA 33014

NAME: 110/220V. POWER INTERCONNECT DIAGRAM

MATL'S.	HEAT TREAT.	FINISH			
DWN. M.J.	APP'D.	DATE 7-27-83	SCALE	PART NO. 904-0006	REV.

ROUTINE MAINTENANCE & SERVICE

BECAUSE OF THE SOLID STATE ELECTRONIC CIRCUITRY, THIS MACHINE SHOULD REQUIRE VERY LITTLE MAINTENANCE, AND ONLY OCCASSIONAL ADJUSTMENT. HOWEVER, IT IS NECESSARY TO TAKE STEPS TO INSURE THIS.

THE VOLUME CONTROL IS LOCATED ON THE PRINTED CIRCUIT BOARD AND CAN BE ACCESSED THROUGH THE REAR CABINET DOOR.

THE VIDEO MONITOR HAS BEEN PROPERLY ADJUSTED BEFORE SHIPPING. OCCASSIONALLY MINOR ADJUSTMENTS ARE NECESSARY. TECHNICAL INFORMATION, ALONG WITH SCHEMATICS, CAN BE FOUND IN THIS MANUAL. ADJUSTMENT CONTROLS FOR THE MONITOR ARE LOCATED ON THE REAR OF THE MONITOR.

"DO NOT MAKE ANY ADJUSTMENTS ON THIS MACHINE WHILE THE POWER IS ON!" THIS MACHINE SHOULD ONLY BE ADJUSTED BY A "QUALIFIED" TECHNICIAN.

FOR SERVICE INFORMATION, CONTACT:

CENTURI, INC.
CUSTOMER SERVICE DEPARTMENT
#800-327-7710 (OUTSIDE THE STATE OF FLORIDA)
#(305) 558-5200 (IN FLORIDA)

POWER SUPPLY

THE COMPUTER BOARD IN THIS GAME OPERATES MOST EFFICIENTLY AND RELIABLY WHEN THE POWER SUPPLY IS SET SO THE VOLTAGE ON THE BOARD IS 5.0 VOLTS, ± 0.1 VOLT. TO CHECK THIS, PLACE A METER ACROSS 5 VOLTS AND GROUND, AT THE EDGE CONNECTOR. IF NECESSARY, ADJUST THE SCREWDRIVER CONTROL ON THE POWER SUPPLY, SO THE METER READS BETWEEN 4.9 AND 5.1 VOLTS.

POWER SUPPLY PSR-1105AP

TROUBLESHOOTING GUIDE

SYMPTOMS:	PROBLEM MAY BE:
1. Huge AC input current	a. Broken Power Transistors Q1, Q2 and Q3.
	b. Wrong insertion of electrolytic capacitors,(wrong polarization).
	c. Faulty Zener Diode ZD1.
	d. Faulty Diodes D2, D3, or D7.
	e. Check output rectifiers.
2. No sub-power output	a. Open resistor R9
3. IC1's pin 4 voltage,3-4 v.	a. +15V's O.C.P. is accidentally operating. Check circuit, Transistors Q4-Q8 are never faulty. Pin 4 normal voltage is 0.4 volts.
4. IC1's pin 3 voltage,3-4 v.	a. +5V's O.C.P. is operating. Check +5V O.C.P. normal voltage is 0.7V.
5. No output	a. Open Driver Transformers T2, T3. Check with scope, both T2 and T3's Primary and Secondary wave form must be the same. Sometimes faulty IC1. Faulty T2 or T3 is very rare.
	b. +5V or +15V output is shorted.
	c. Resistor R9 open.

DISPLAY PC BOARD TO

XY MONITOR ADJUSTMENT PROCEDURE

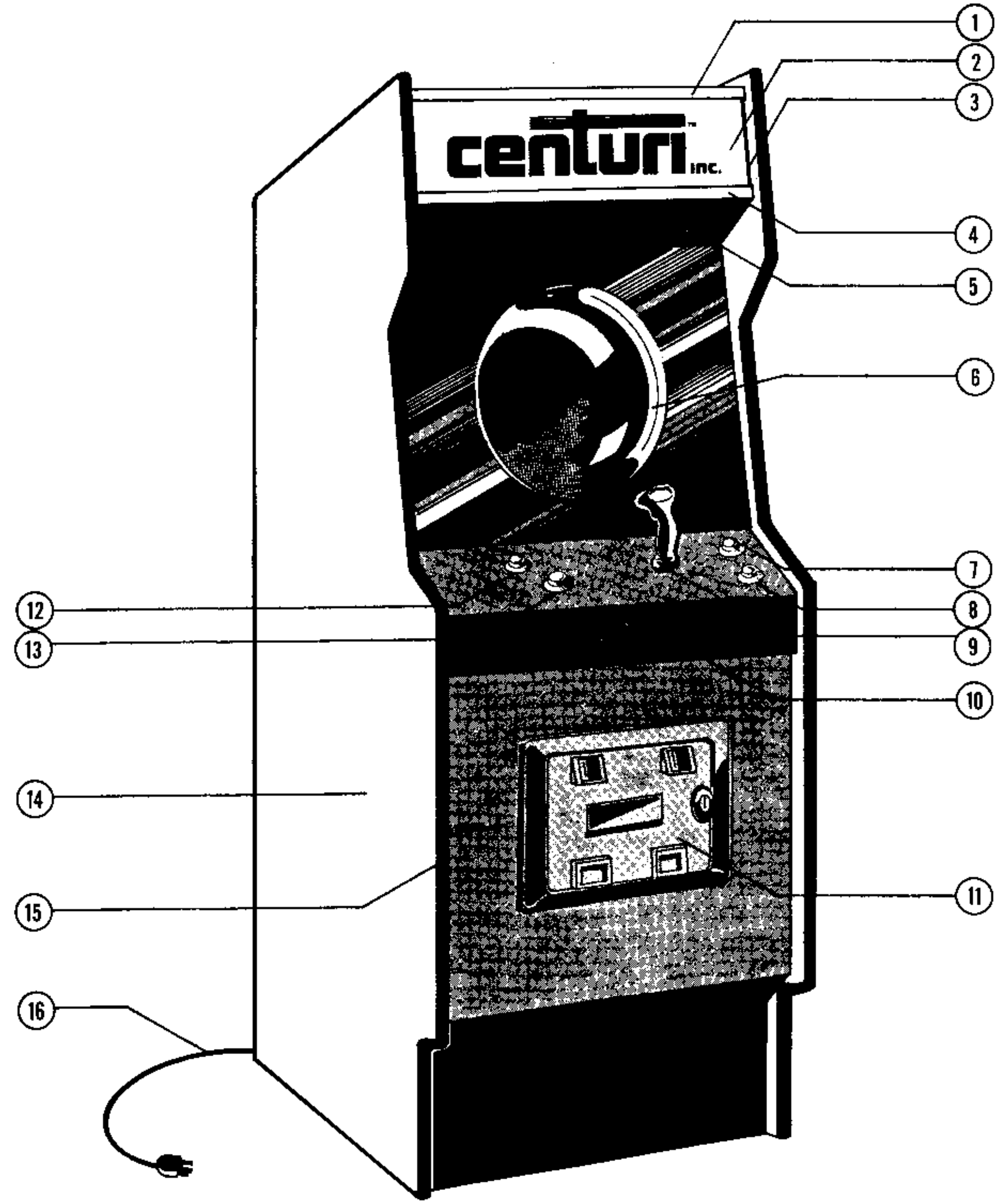
1. Turn power on to game and allow to warm up for 15 minutes.

2. Power supply should be checked and adjusted before proceeding with monitor adjustments.

   a. measure the DC voltage across Capacitor C-9 on the Display PC Board. It should read +5 volts (± .1v).
   b. adjust the trimmer on the power supply if necessary.

3. Monitor display adjustment
   (all controls refer to AZTARAC Display Board)

   a. press and release the diagnostic switch, located inside the Coin Door, until RED concentric diamonds are displayed.
   b. adjust the Intensity Control R27, (labeled "INT") , on the Display Board until inner most diamond is just visible.
   c. using the "XOFS" Control R20, and the "XABS" Control R23, adjust the display until the horizontal corners of the diamonds are aligned. This will require alternate adjustments of "XOFS" and "XABS" until the horizontal "TIPS" of the diamonds are aligned.
   d. using the "YOFS Control R16 and the "YABS" Control R25, adjust the display until the vertical corners of the diamonds are aligned.
   e. repeat steps c and d until the apices of the RED diamonds are aligned and meet neatly.
   f. press and release the diagnostic switch, inside the Coin Door until the large circular display with switch information is displayed.
   g. using the "X-GAIN" Control R24, the "Y-GAIN" Control R26, the "XØ" Control R22 and the "YØ" Control R18, adjust the size and center the display so that the outer RED circle is "clipped off" evenly at four spots while the inner yellow circle remains solid.
   h. press and release the diagnostic switch, inside the Coin Door, until the RED concentric diamonds are displayed.
   i. adjust the GAIN and CENTERING Controls of the Wells-Gardner 19K6401 X-Y Monitor as described in the appropriate service manual to cause the display to be centered on the screen with the ends of the RED/YELLOW lines just touching the edge of the screen viewing area.



(FIG, 2) FRONT VIEW OF CABINET.

AZTARAC

Cabinet Parts List

Item No.	Part No.	Description
1	302-2592	Top Angle Hold Down Bracket
2	802-3111	Marquee, Aztarac
3	803-0960	Vinyl Trim "U" Channel 7¼" lg
4	302-2530	Glass Holding Bracket
5	403-1170	Speaker 5¼", 8 ohm, 15W
6	802-3112	Plexiglass Dome, Aztarac
6a	804-3131	CRT Bezel
7	701-1171	Red Button
8	701-1170	White Button
8a	409-1163	Switch w/Holder
9	702-1205	Joystick Ass'y, Aztarac
10	801-3091	Control Panel Overlay
11	009-4697	Coin Door, WICO
12	701-1171	Red Button
13	702-1204	Track Wheel Ass'y w/Handle
14	004-4338	Wood Cabinet, Aztarac
15	803-0965	Vinyl Trim Molding
16	402-1511	AC Line Cord

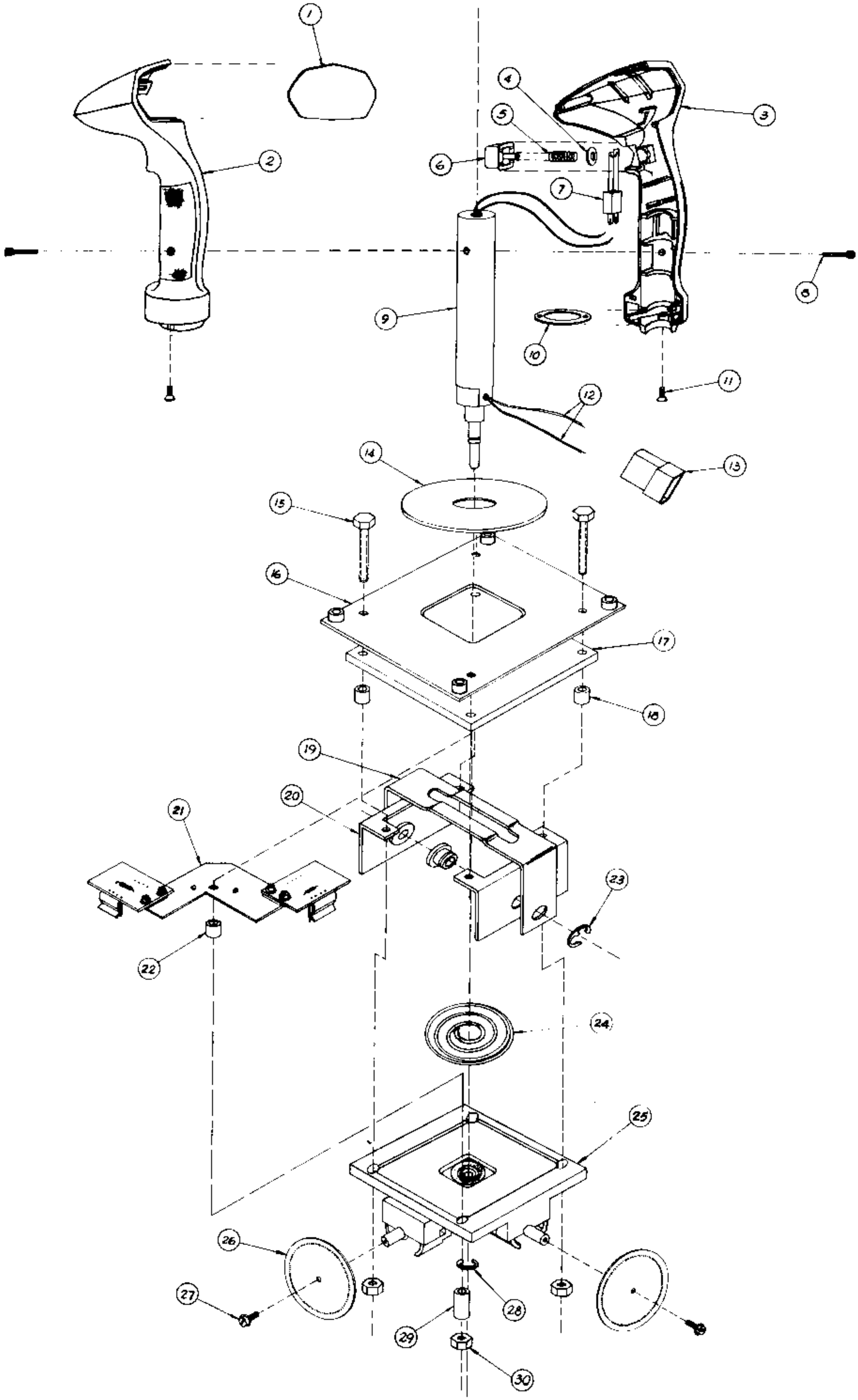

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30

FIGURE- 3

ENCODER JOYSTICK ASSEMBLY

PARTS LIST

Item #	Wico Part #	Description	Req'd
1	15-9439-03	Centuri Nameplate	1
2	15-9403	Left Handle	1
3	15-9402	Right Handle	1
4	30-1604	Washer, ¼ ID x 7/16 OD	1
5	15-9438	Spring-Trigger	1
6	98-0158	Trigger Assembly	1
7	15-1261	Switch Assembly	1
8	30-1735	Button head cap screw,#6-32x ½ LG	2
9	98-0154	Tube Sub-Assembly	1
10	15-9412	Washer-Threaded	1
11	30-0215	M.S. Phillips Oval Hd,#8-32 x 3/8 LG	2
12	97-0013	Wire Harness Sub-Assembly	1
13	23-1951	3 Pin Plug Assembly, Female	1
14	15-9928	Slide Washer	1
15	30-2242	Carr. Bolt,¼-20 x 2" LG,Threaded 7/8"	4
16	98-0147	Top Mtg. Plate Assembly	1
17	15-9924	Limiter	1
18	15-9933-01	Spacer	3
19	15-9930	Bracket	1
20	98-0157	Bracket w/Bearing Sub-Assembly	2
21	98-0153	P.C. Board and Bracket Assembly	1
22	15-9933-02	Spacer-Short	1
23	30-0937	"E" Ring, 5/8" Dia.	2
24	30-7729	Conical Spring	1
25	98-0173	Top Assembly	1
26	15-9600	Encoder Disk	2
27	30-0205	M.S. Fil.Hd.,Sem.,#4-40 x 5/16" Lg.	2
28	30-1096-06	"C" Ring (5103-25)	1
29	15-9935	Spacer	1
30	30-2002	Hex Nut w/Washer, ¼-20	4

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL
AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE
EXPRESSED PERMISSION OF CENTURI, INC.

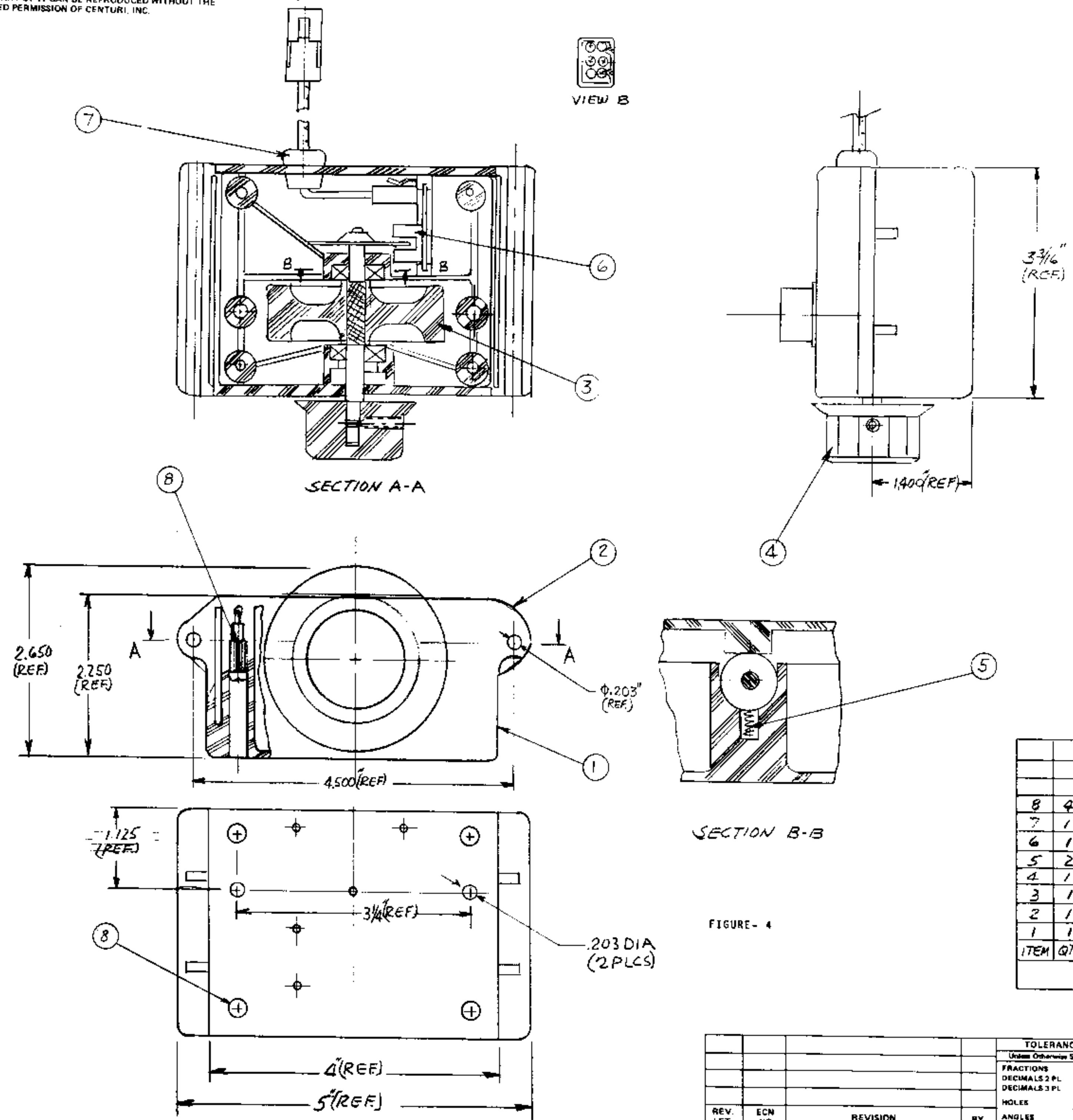


FIGURE- 4

ITEM	QTY	WICO PART NO	DESCRIPTION
8	4	30-1317	#6 7/8 LG POLYFAST PHIS
7	1	20-1991	NYLON RELIEF BUSHING
6	1	15-2053	PC BOARD & WIRE HARNESS ASSY
5	2	15-1728	SPRING
4	1	15-2057	KNOB ASSY
3	1	15-2050	TRACK WHEEL 2 1/2" SUB. ASSY
2	1	15-2048-01	COVER
1	1	15-2047-01	BOTTOM

BILL OF MATERIAL

QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

REV. LET.	ECN NO.	REVISION	BY

TOLERANCES
Unless Otherwise Specified
FRACTIONS ± 1/32
DECIMALS 2 PL ± .015
DECIMALS 3 PL ± .005
HOLES + .003 − .001
ANGLES ± 1/2°
SHT MET BENDS ± 2°

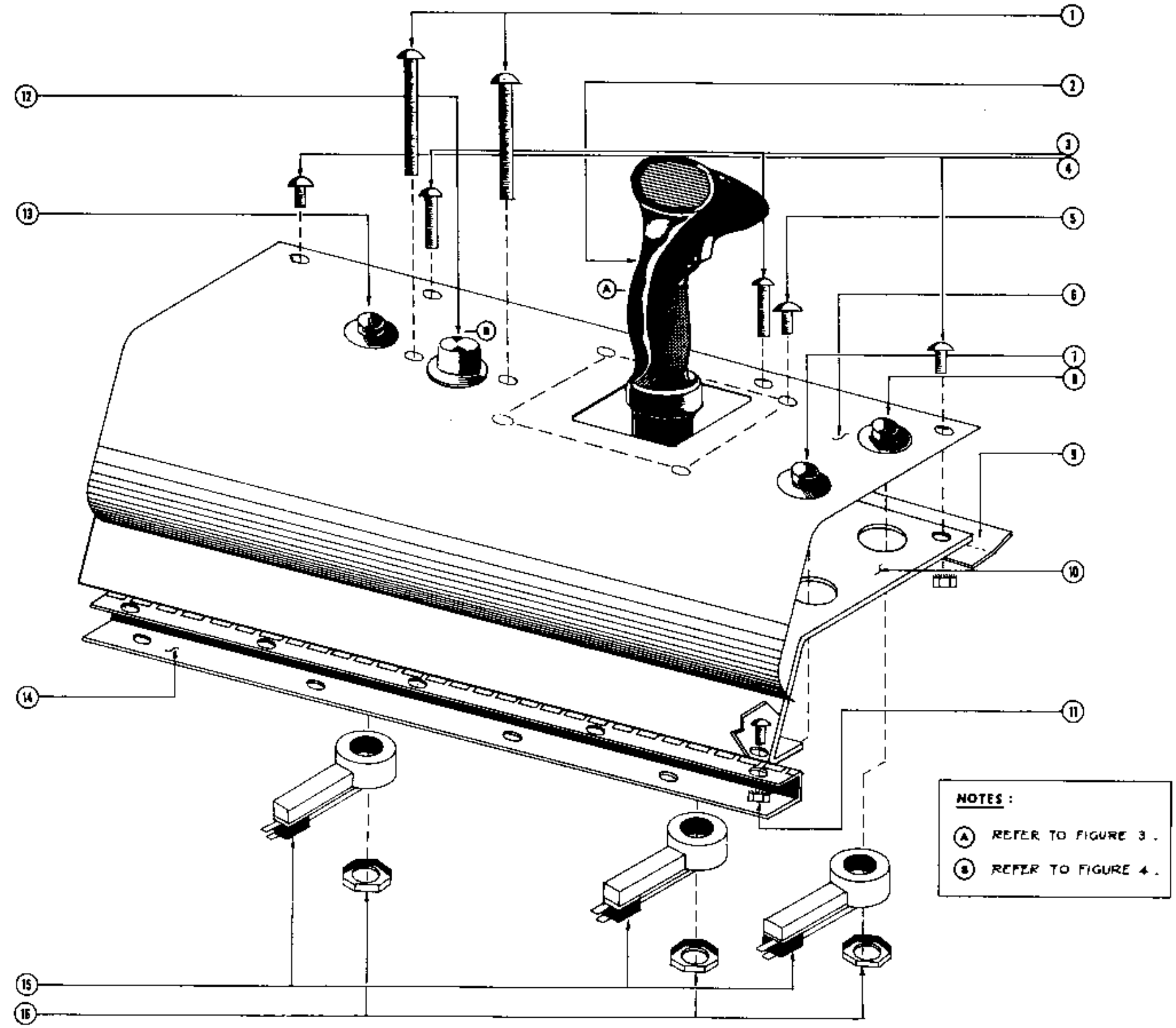
centuri HIALEAH, FLORIDA 33014

NAME: 2 1/2 TRACK WHEEL ASS'Y W/HANDLE

MAT'L'S.	HEAT TREAT.	FINISH

DWN	APP'D	DATE	SCALE	PART NO.	REV.
AAN		7-25-83		702-1204	

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE EXPRESSED PERMISSION OF CENTURI, INC.



EXPLODED VIEW OF CONTROL PANEL ASS'Y.

FIGURE- 5

QC APV'D	PROD APV'D	QTY	ASSEMBLY NO

REV. LET.	ECN NO.	REVISION	BY

TOLERANCES Unless Otherwise Specified	
FRACTIONS	± 1/32
DECIMALS 2 PL	± .015
DECIMALS 3 PL	± .005
HOLES	+ .003 − .001
ANGLES	± 1/2°
SHT. MET BENDS	± 2°

centuri			HIALEAH, FLORIDA 33014		
NAME EXPLODED VIEW of CONTROL PANEL.					
MAT'L'S		HEAT TREAT.		FINISH	
DWN. K.D.Thomas	APP'D. Thomas	DATE 8/4/83	SCALE	PART NO	REV

AF 17899C

CONTROL PANEL ASSEMBLY

PARTS LIST

Item No.	Centuri P/N	Description
1	111-2341	Carriage Bolt,B.O. 10-24 X 4"
2	702-1205	Encoder Joystick Ass'y
3	111-2326	Carriage Bolt,B.O. 10-24 x 1 3/4"
4	111-2322	Carriage Bolt,B.O. 10-24 X 1/2"
5	111-2323	Carriage Bolt,B.O. 10-24 X 3/4"
6	801-3091	Control Panel Overlay, Aztarac
7	701-1170	White Button, Wico 19-0255-01
8	701-1171	Red Button, Wico 15-0520-01
9	302-2533	Deck & Glass Angle Bracket
10	301-2523	Control Panel, Aztarac
11	115-2384	Hex Nut w/ext. star washer, 10-24
12	702-1204	Track Wheel Ass'y w/Handle
13	701-1171	Red Button, Wico 15-0520-01
14	306-2661	Hinge
15	409-1163	Switch w/Holder, Wico 15-0925-01
16	103-0951	Pal Nut, Wico 19-0254-01

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE EXPRESSED PERMISSION OF CENTURI, INC.

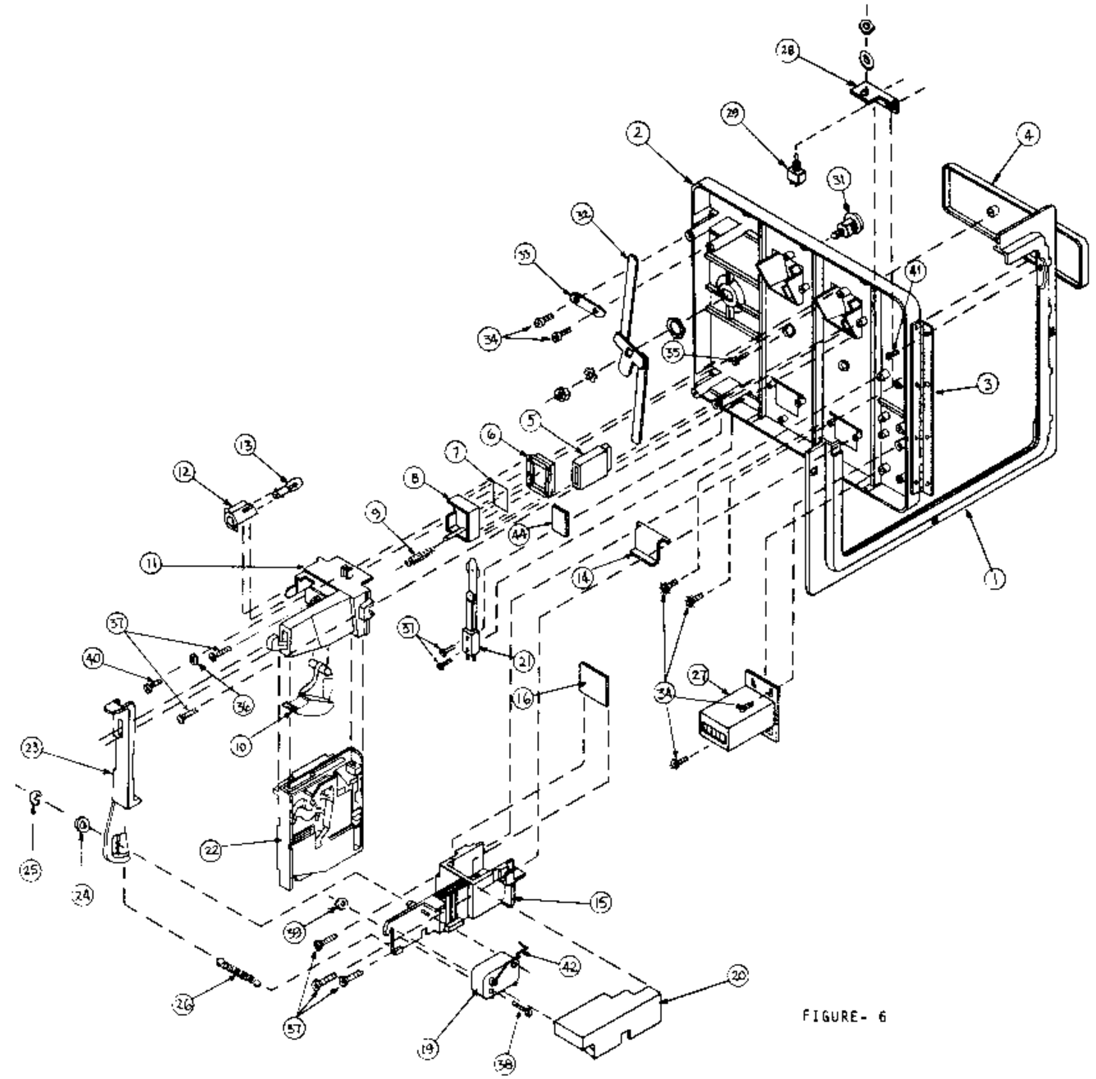


FIGURE- 6

WICO P/N 15-8291-02

REV. LET.	ECN NO.	REVISION	BY	TOLERANCES (Unless Otherwise Specified)	centuri				
				FRACTIONS ± 1/32; DECIMALS 2 PL ± .015; DECIMALS 3 PL ± .005; HOLES + .003 − .001; ANGLES ± 1/2°; SHT. MET BENDS ± 2°	HIALEAH, FLORIDA 33014				
					NAME: ST'D SINGLE COIN DOOR W/2 COIN ENTRY				
					MAT'L'S.	HEAT TREAT.	FINISH		
					DWN: J.B.	APP'D: JWF	DATE: 8-8-83	SCALE: ½	PART NO.: 0C9-4697

QC. APV'D	PROD APV'D	QTY	ASSEMBLY NO

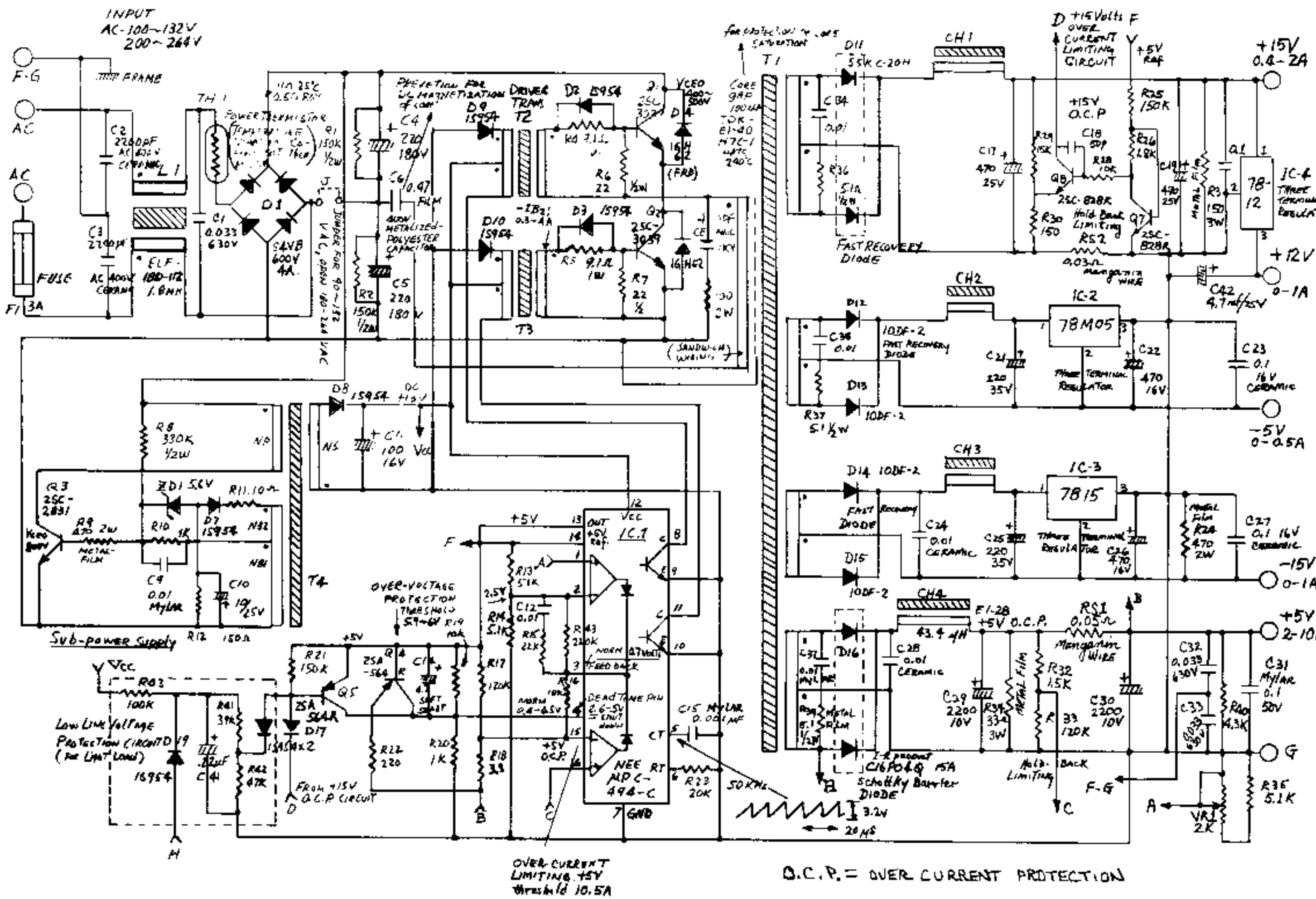
STANDARD COIN DOOR

WICO P/N 15-8281-01

PARTS LIST

ITEM NO.	Wico P/N	Description	Req'd
1	15-8039	Door Frame	1
2	15-8038	Door	1
3	30-9125	Hinge	1
4	15-8117	Nameplate, Centuri	1
5	15-8074	Coin Entry Plate	2
6	15-8072	Push Button, Cover	2
7	26-0583	Label, Push to reject, 25¢	2
8	15-8071	Push Button	2
9	30-7722	Compression Spring	2
10	15-8084	Reject Lever	2
11	15-8075	Coin Chute	2
12	15-9419	Lamp Holder Ass'y	2
13	21-0044	Miniature Lamp, 6V	2
14	15-8083	Coin Return Door	2
15	15-8081	Coin Box	2
16	15-8092	Guard	2
19	23-1347	Coin Switch	2
20	15-8043	Switch Cover	2
21	15-1255	Slam Switch	1
22	31-4015	Plastic Coin Acceptor, 25¢	2
23	15-8086	Coin Acceptor Retainer	2
24	30-1790	Washer,.255 ID x .625 OD x .037" Thick	2
25	30-0931	"E" Ring, ¼"	2
26	30-7372	Extension Spring	2
27	31-4550	Coin Counter, 6VDC, W/Brkt	1
28	15-8113	Bracket	1
29	23-1370	Service Switch	1
31	34-1855	Lock Ass'y, 5/8"	1
32	55-2905	Lock Cam Ass'y	1
33	55-2909	Lock Cam Plate	2
34	30-3001	M.S. Pan Hd, Phil.#6-32 x ¼"lg	9
35	30-0164	M.S. F/Hd, Phil.#6-32 x 3/8"lg	2
36	30-1921	Washer,.165 ID x .475 OD x .032" Thick	2
37	30-2826	M.S. Fil/Hd. Phil.#6-32 x 7/16"lg	12
38	30-2818	M.S. Rd/Hd. #4-40 x 7/8" lg	2
39	30-1213	Hex. Nut, #4-40	2
40	30-2778	M.S. Fil/Hd. Phil.#6-32 x ½"lg	2
41	30-2833	M.S.Pan/Hd. Phil. #6-32 x 3/16"lg	9
42	23-1348	Wire Form (Coin Switch)	2
43	97-0007	Door Cable Ass'y	1
44	26-3125	Double Sided Tape(3M) ½"x½"	1
45	15-8107	Key Hook	1

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE EXPRESSED PERMISSION OF CENTURI, INC.



O.C.P. = OVER CURRENT PROTECTION

CAPACITORS, NOT MENTIONED ARE ALL MYLAR-FILM CAPACITORS

RESISTORS NOT MENTIONED ARE ALL CARBON RESISTORS ¼ WATT TYPE.

				QC. APV'D	PROD. APV'D / QTY. / ASSEMBLY NO
TOLERANCES Unless Otherwise Specified	centuri				HIALEAH, FLORIDA 33014
FRACTIONS ± 1/32; DECIMALS 2 PL ± .015; DECIMALS 3 PL ± .005	NAME: SWITCHING POWER SUPPLY, PSR-1105-AP				
HOLES + .003 − .001	MATL'S		HEAT TREAT.		FINISH
ANGLES ± 1/2°; SHT. MET BENDS ± 2°	DRN. M.A.	APVD.	DATE 8-1-83	SCALE	PART NO. 414-2021 / REV.

REV. LET.	ECN NO.	REVISION	BY

AP 1785C

Power Supply PSR-1105AP

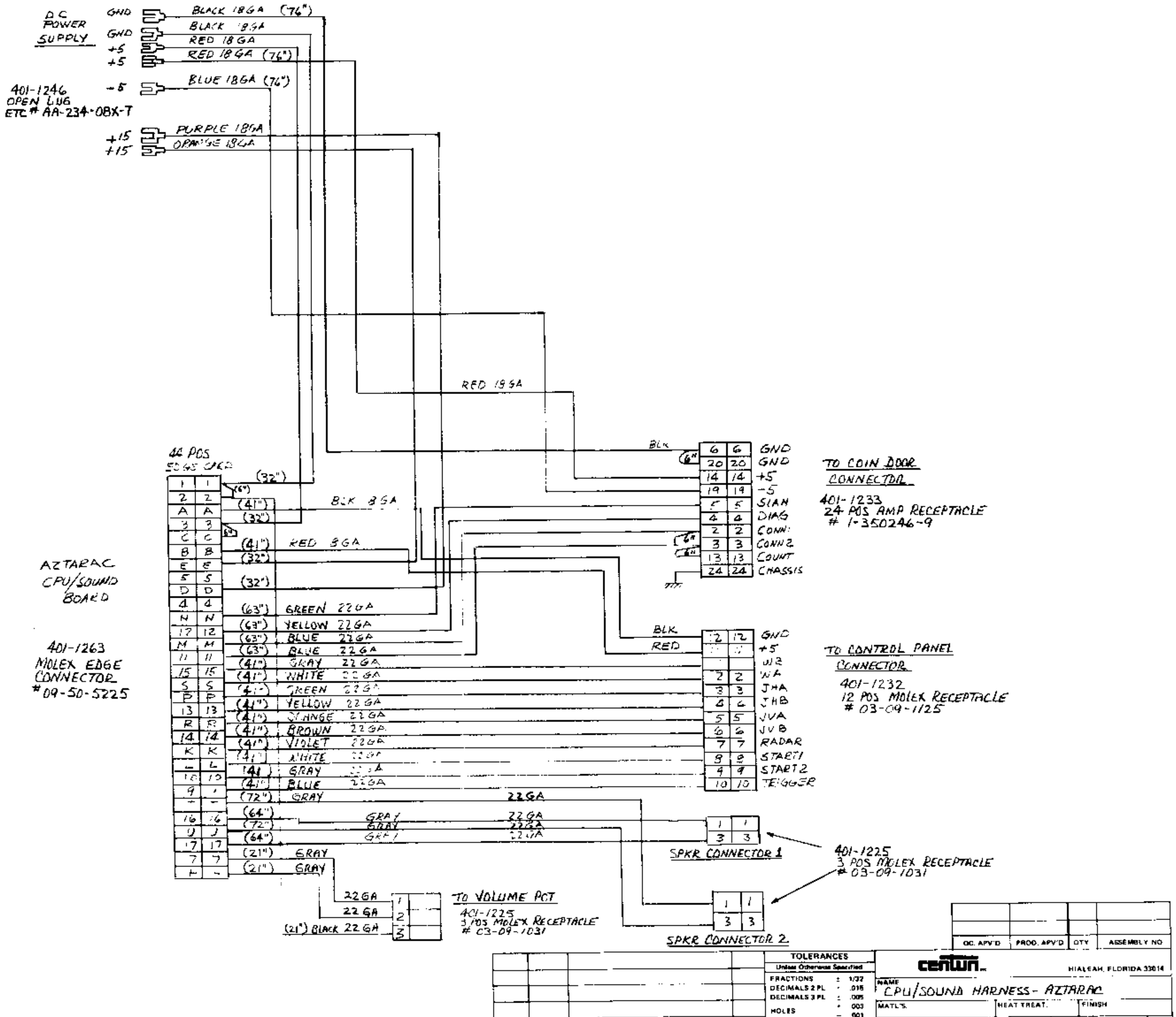
Parts List

Symbol	Description	Qty
D1	Bridge Rectifier, S4VB-600V	1
D16	Schottky Barrier Diode, C16P04Q	1
D4,5	Fast Recovery Diode, 1GH62, 400V	2
D11	Fast Recovery Diode, S5KC20H, 200V	1
D2,3,12,13 14,15	Fast Recovery Diode, 10DF-2, 200V	6
D7,8,9,10, 17,18	Switching Diode, 1S954	6
ZD1	Zener Diode, 05Z5, 6A, 5.6V, 500mw	1
Q1,2	Power Transistor, 2SC3039	2
Q3	Power Transistor, 2SC3149	1
Q4,5	Transistor, 2SA564R	2
Q6,7	Transistor, 2SC828R	2
IC2	Regulator, 78M05	1
IC3	Regulator, 7812	1
IC4	Regulator, 7815	1
IC1	Switching Control, mPC494C	1
T1	Power Transformer, SM-2405	1
T2,3	Driver Transformer, SM-2215B	2
T4	Sub-Power Supply Transformer, SM-2399	1
CH1	EE-25, Choke Inductor, SM-2374	1
CH2,3	EE-16, Choke Inductor, SM-2367	2
CH4	EI-28, Choke Inductor, SM-2391	1
L1	AC Line Filter, ELF-18D-112	1
TH1	Power N.T.C. Thermistor, TD18-010	1
C2,3	Capacitor,Ceramic, 2200pf, AC 400V, ±20%	2
C1,32,33	Capacitor,Metalized Polyester,0.033mf,630V.	3
C6	Capacitor,Metalized Polyester,0.47mf,400V.	1
C15	Capacitor,Polyester Film, 0.001mf,50V.	1
C9,12,34,35,37	Capacitor,Mylar Film,0.01mf,50V	5
C31	Capacitor,Mylar Film, 0.1mf,50V.	1
C18	Capacitor,Ceramic,50pf, 50V	1
C7	Capacitor,Ceramic, 470pf, 1KV	1
C16,24	Capacitor,Ceramic, 0.01mf, 50V	2
C20,23,27	Capacitor,Ceramic, 0.1mf, 16V	3
C14,42	Cap. Electrolytic, 4.7mf, 25V	2
C10	Cap. Electrolytic, 10mf, 25V	1
C11	Cap. Electrolytic, 100mf, 16V	1
C21,25	Cap. Electrolytic, 220mf, 35V	2
C22,26	Cap. Electrolytic, 470mf, 16V	2
C17,19	Cap. Electrolytic, 470mf, 25V	2
C29,30	Cap. Electrolytic, 2200mf, 10V	2
C4,5	Cap. Electrolytic, 220mf, 180V	2
R3	Resistor,Metal Film,100 Ohm,2W, ±5%	1
R24	Resistor,Metal Film,330 Ohm,2W, ±5%	1
R9	Resistor,Metal Film,470 Ohm,2W, ±5%	1
C41	Cap. Electrolytic, 0.22mf, 50V	1

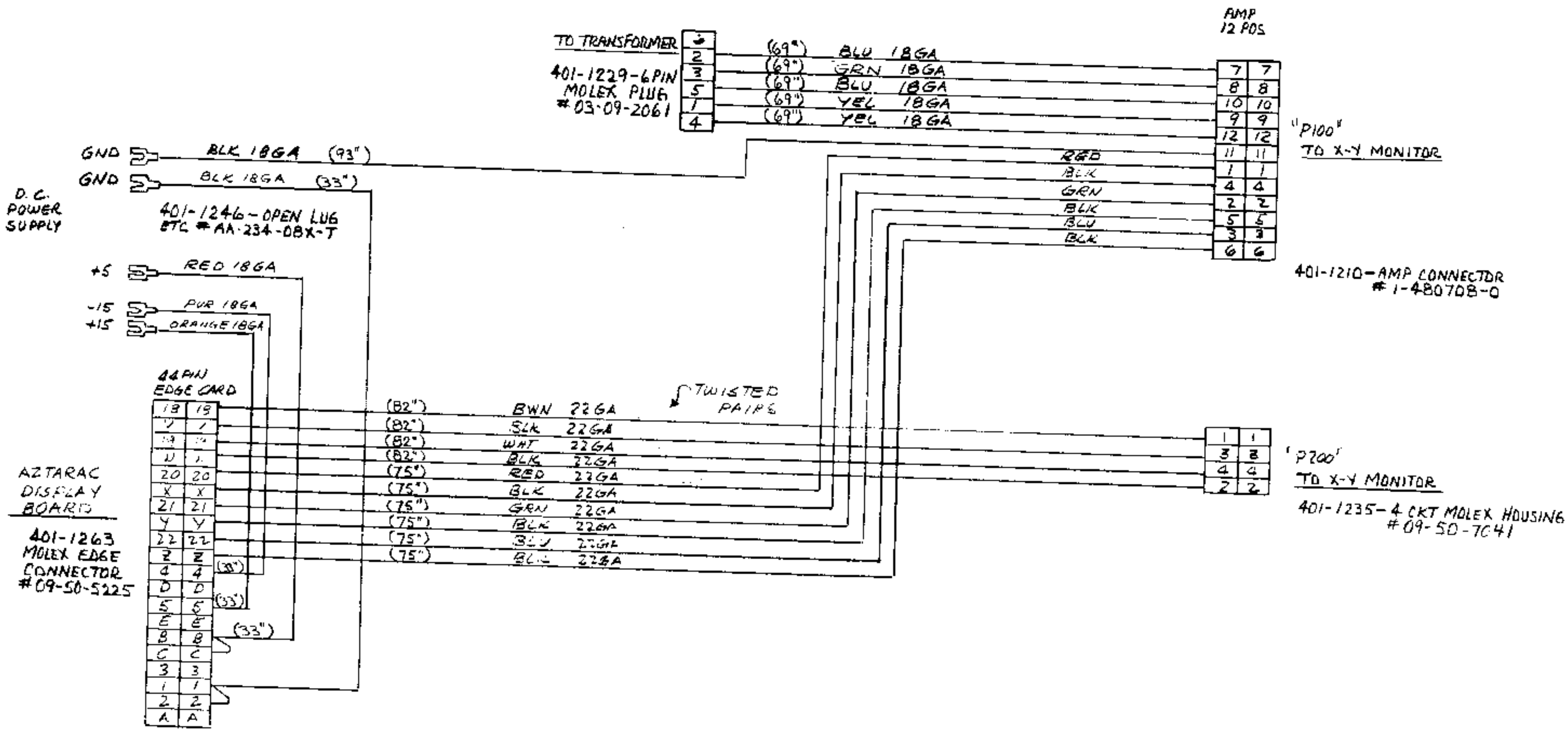
Power Supply PSR-1105AP
Parts List

Symbol	Description	Qty
R31	Resistor,Metal Film,150 Ohm,3W, ±5%	1
R34	Resistor,Metal Film, 33 Ohm,3W, ±5%	1
R36,39	Resistor,Metal Film,5.1 Ohm,1W, ±5%	2
R4,5	Resistor,Metal Film,9.1 Ohm,1W, ±5%	2
R37	Resistor,Carbon Film,5.1 Ohm,½W, ±5%	1
R6,7	Resistor,Carbon Film,22 Ohm, ½W, ±5%	2
R1,2	Resistor,Carbon Film,100K Ohm, ½W, ±5%	2
R8	Resistor,Carbon Film,330K Ohm, ½W, ±5%	1
R11	Resistor,Mini-Metal Film,10 Ohm, ½W, ±5%	1
R12	Resistor,Mini-Metal Film,150 Ohm, ½W, ±5%	1
R10	Resistor,Mini-Metal Film,1K Ohm, ½W, ±5%	1
R18	Resistor,Carbon Film, 3.3 Ohm, ¼W, ±5%	1
R22	Resistor,Carbon Film, 220 Ohm, ¼W, ±5%	1
R30	Resistor,Carbon Film, 150 Ohm, ¼W, ±5%	1
R20	Resistor,Carbon Film, 1K Ohm, ¼W, ±5%	1
R32	Resistor,Carbon Film, 1.5K Ohm, ¼W, ±5%	1
R26	Resistor,Carbon Film, 1.8K Ohm, ¼W, ±5%	1
R40	Resistor,Carbon Film, 4.3K Ohm, ¼W, ±5%	1
R13,14,35	Resistor,Carbon Film, 4.1K Ohm, ¼W, ±5%	3
R16,19	Resistor,Carbon Film, 10K Ohm, ¼W, ±5%	2
R29	Resistor,Carbon Film, 15K Ohm, ¼W, ±5%	1
R23	Resistor,Carbon Film, 20K Ohm, ¼W, ±5%	1
R15	Resistor,Carbon Film, 22K Ohm, ¼W, ±5%	1
R17,33	Resistor,Carbon Film, 129K Ohm, ¼W, ±5%	2
R21,25	Resistor,Carbon Film, 150K Ohm, ¼W, ±5%	2
R40	Resistor,Carbon Film, 100K Ohm, ¼W, ±5%	1
R41	Resistor,Carbon Film, 39K Ohm, ¼W, ±5%	1
R42	Resistor,Carbon Film, 47K Ohm, ¼W, ±5%	1
R43	Resistor,Carbon Film, 220K Ohm, 1/8W, ±5%	1
RS1	Resistor,Wire Manganin,A-2145,0.005 Ohm,2 ø	1
RS2	Resistor,Wire Manganin,A-2256,0.03 Ohm,1 ø	1
VR1	Potentiometer,Mini, 2K Ohm	1
F1	Fuse, 3 Ampere	

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL
AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE
EXPRESSED PERMISSION OF CENTURI, INC.



THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL
AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE
EXPRESSED PERMISSION OF CENTURI, INC.



REV LET.	ECN NO.	REVISION	BY

TOLERANCES
Unless Otherwise Specified
FRACTIONS ± 1/32
DECIMALS 2 PL ± .015
DECIMALS 3 PL ± .005
HOLES + .003 − .001
ANGLES ± 1/2
SHT. MET BENDS ± 2

QC APV'D	PROD APV'D	QTY	ASSEMBLY NO.

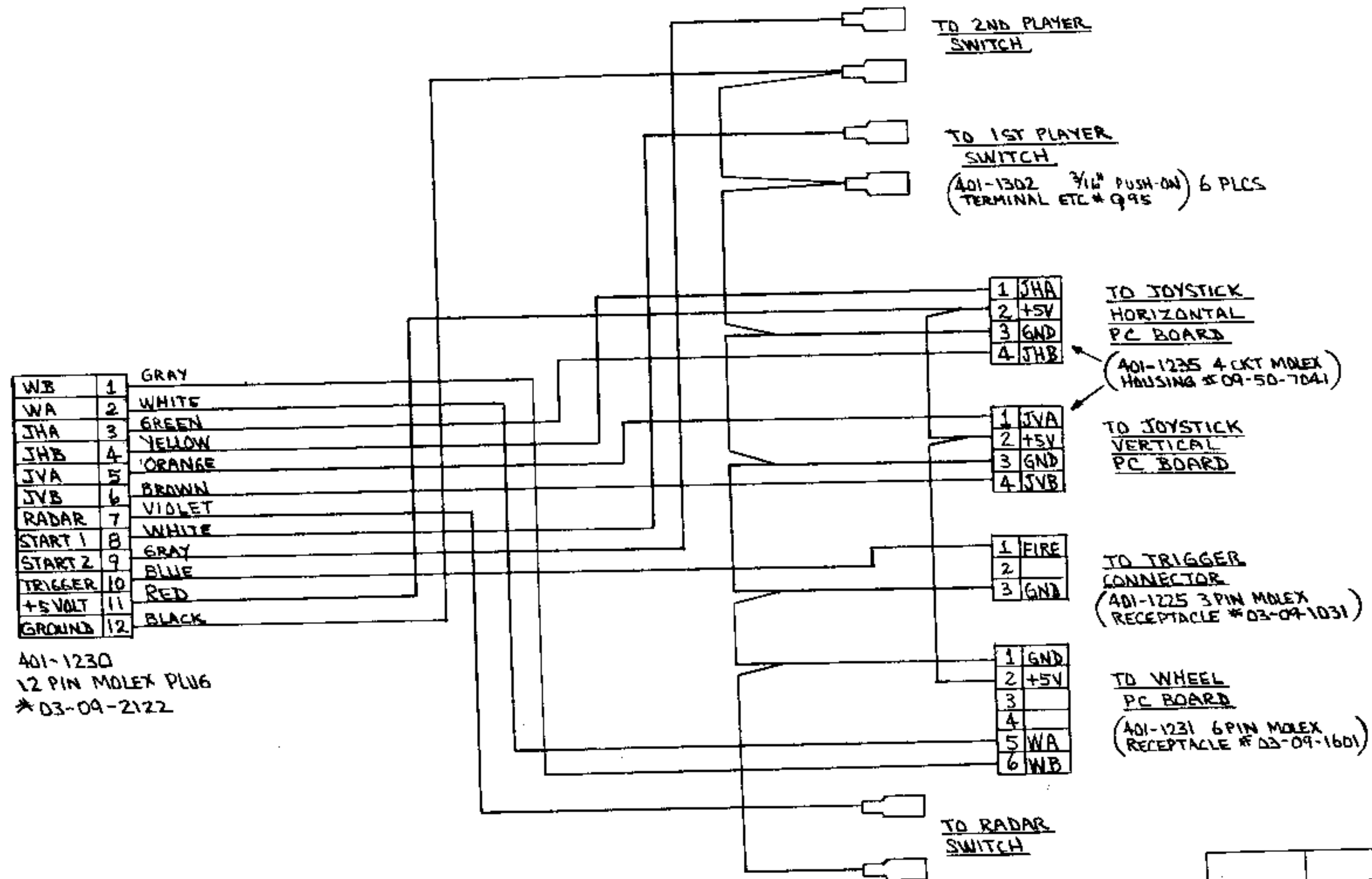
centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY HARNESS

MATL'S. | HEAT TREAT | FINISH

DWN. EA11 | APP. | DATE 5-23-83 | SCALE | PART NO. 008-4904 | REV.

THE MATERIAL CONTAINED HEREIN IS CONFIDENTIAL AND NO PART OF IT CAN BE REPRODUCED WITHOUT THE EXPRESSED PERMISSION OF CENTURI, INC.



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

REV. LET.	ECN NO.	REVISION	BY

TOLERANCES Unless Otherwise Specified

FRACTIONS	± 1/32
DECIMALS 2 PL	± .015
DECIMALS 3 PL	± .005
HOLES	+ .003 − .001
ANGLES	± 1/2°
SHT. MET BENDS	± 2°

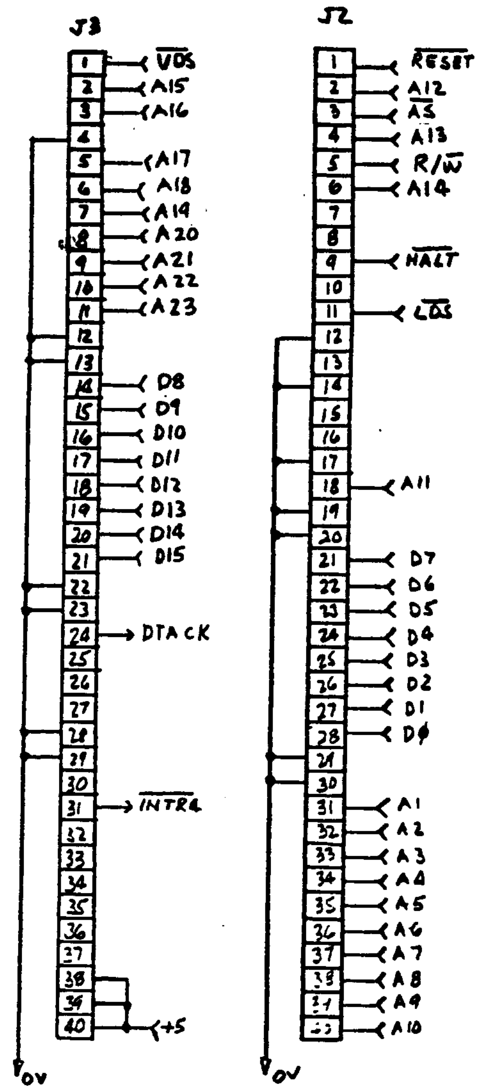
centuri HIALEAH, FLORIDA 33014

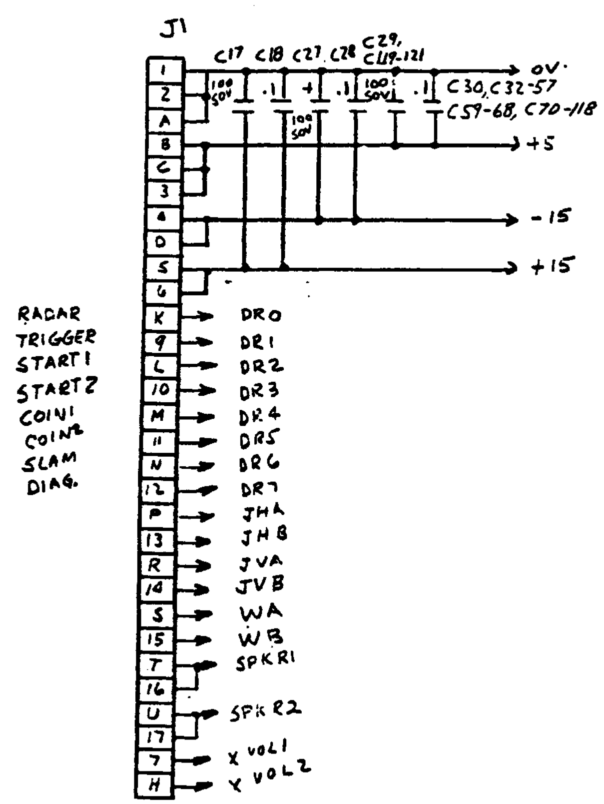
NAME: CONTROL PANEL WIRE HARNESS-AZTARAC

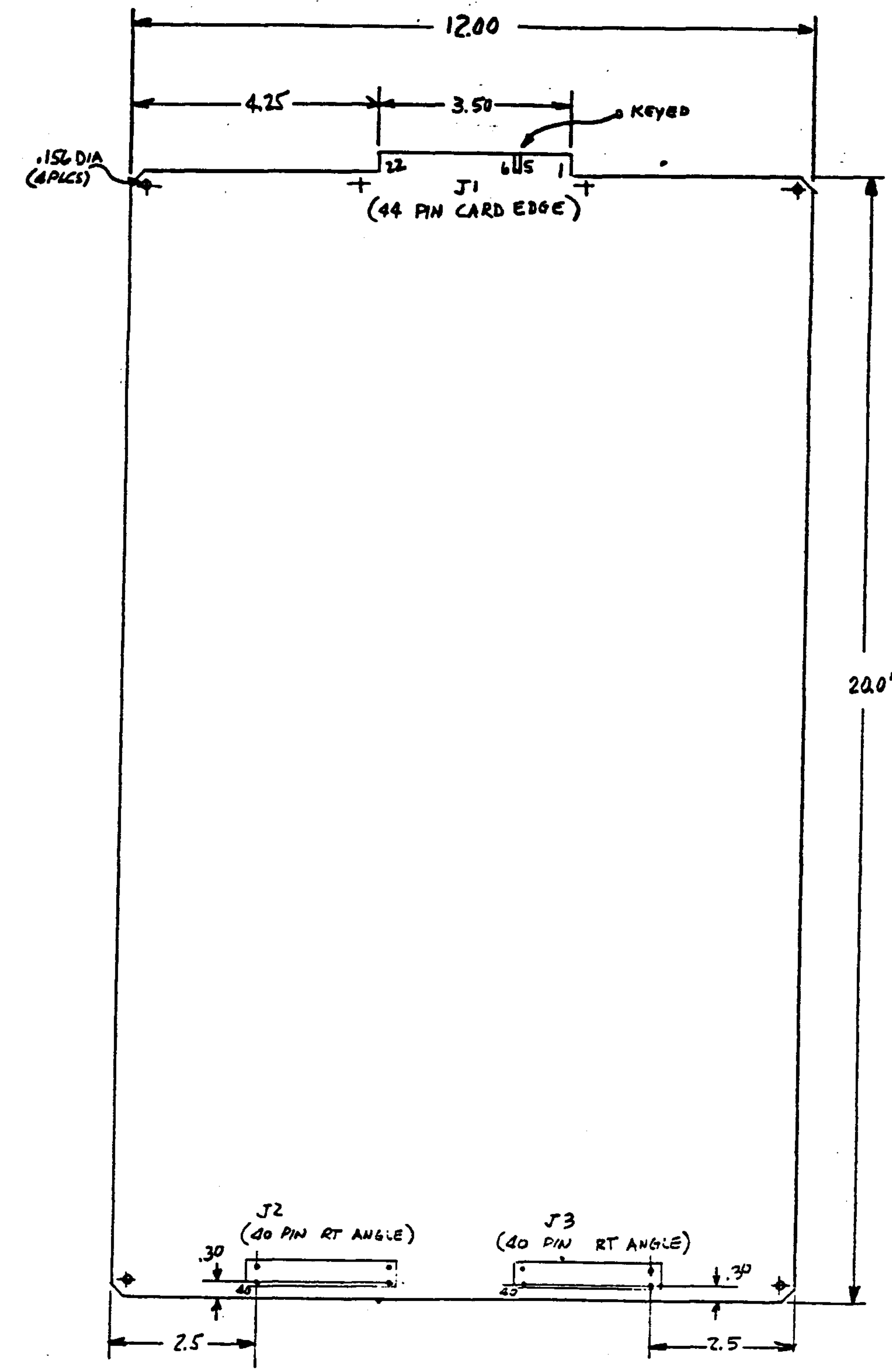
MAT'L'S. | HEAT TREAT. | FINISH

DWN.	APP'D.	DATE	SCALE	PART NO.	REV.
M.A.	[signature]	8-4-83	N/A	008-4905	

AF 178999







BOARD OUTLINE (NOT TO SCALE)
COMPONENT SIDE SHOWN

QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

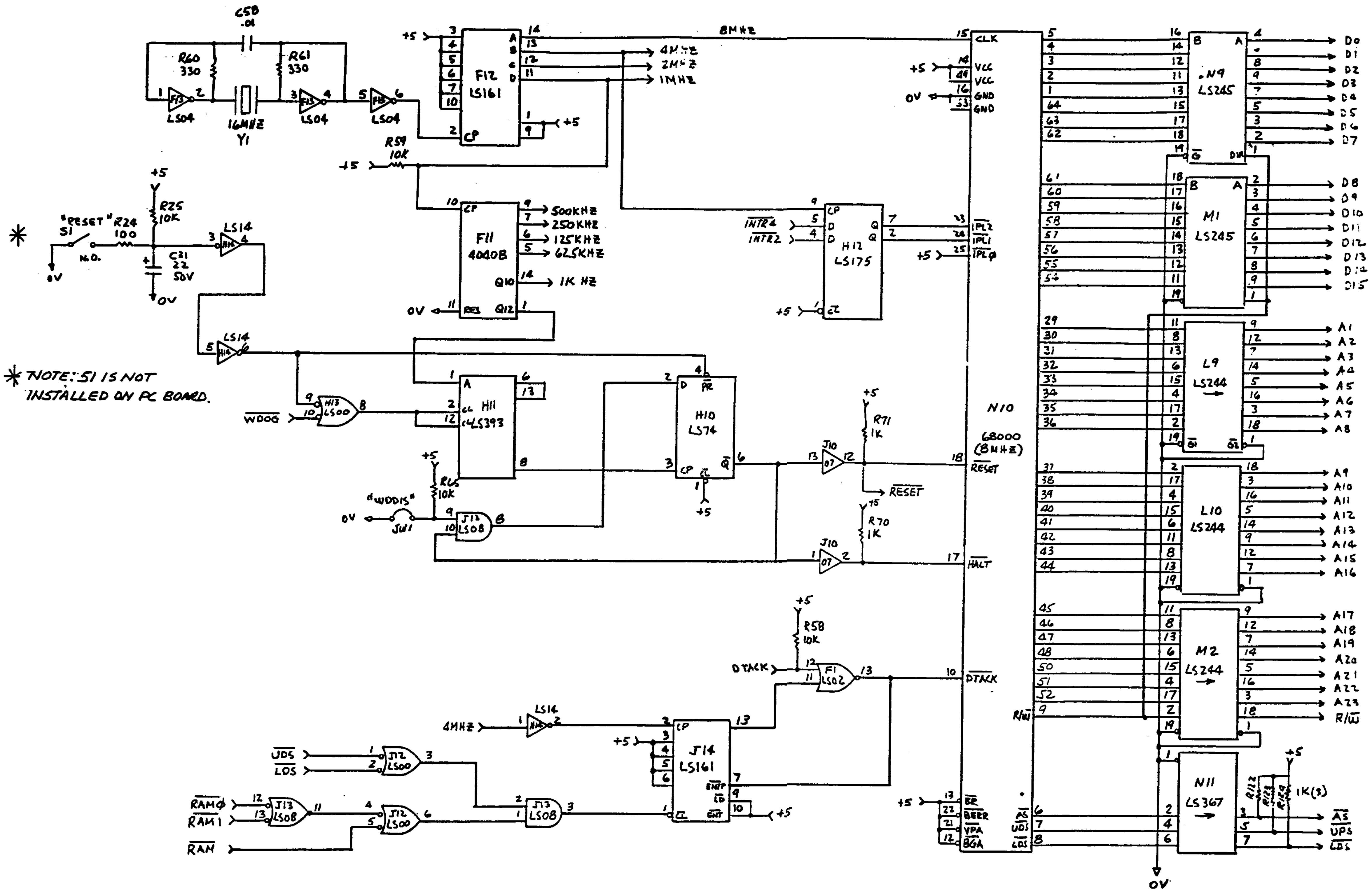
TOLERANCES Unless Otherwise Specified
FRACTIONS ± 1/32
DECIMALS 2 PL ± .015
DECIMALS 3 PL ± .005
HOLES + .003 − .001
ANGLES ± 1/2°
SHT. MET BENDS ± 2°

centuri — HIALEAH, FLORIDA 33014

NAME: AZTARAC CPU/SOUND BOARD

MAT'L: | HEAT TREAT: | FINISH:

DWN. AAH | APP'D | DATE 5-16-83 | SCALE | PART NO. 905-4902 | REV.



* NOTE: S1 IS NOT INSTALLED ON PC BOARD.

QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

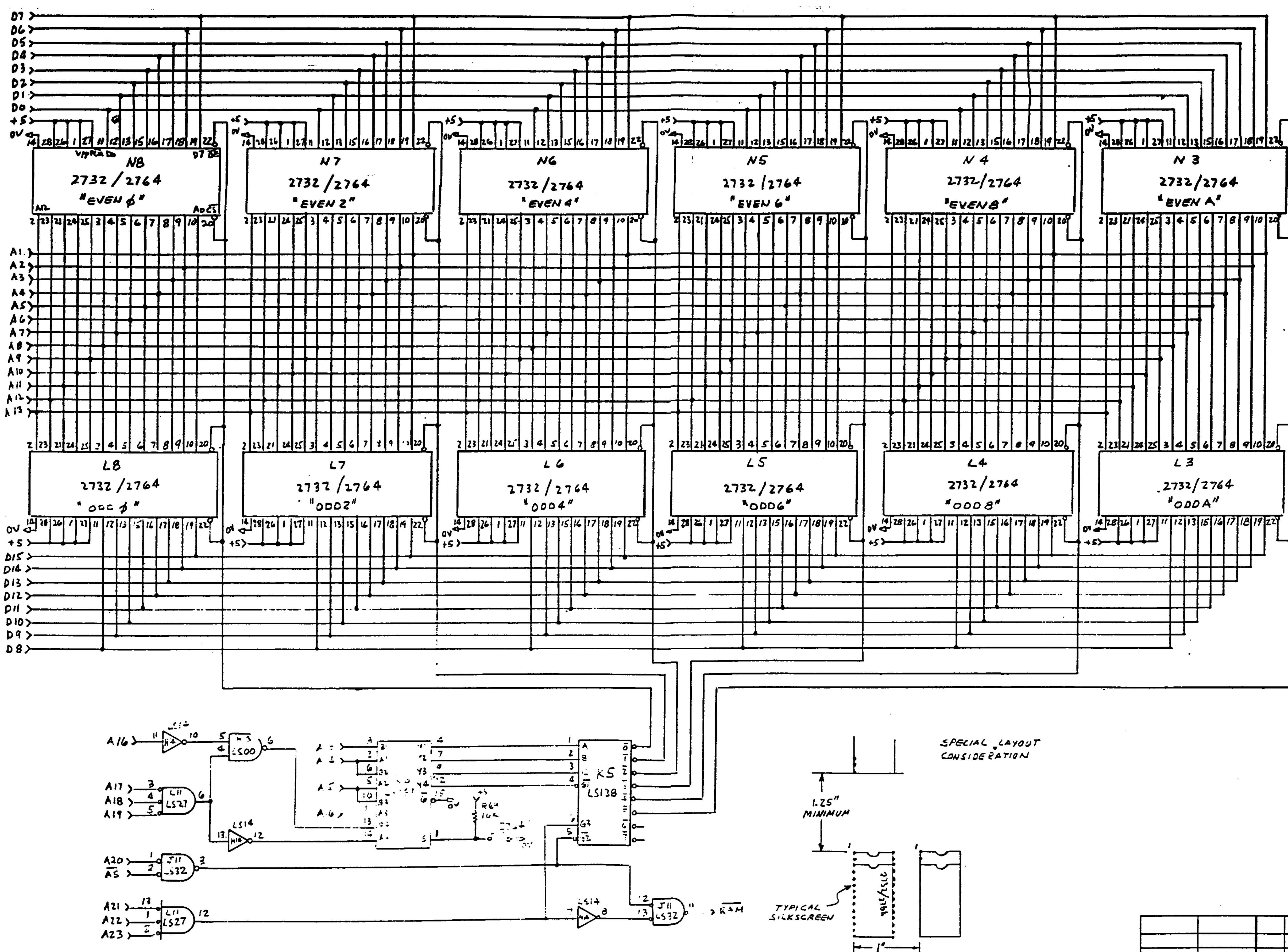
centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC CPU/SOUND BOARD

MATL'S. | HEAT TREAT. | FINISH

DWN. AAN | APP'D. | DATE 5-17-83 | SCALE | PART NO. 905-4902 | REV.

PAGE 2 OF 7



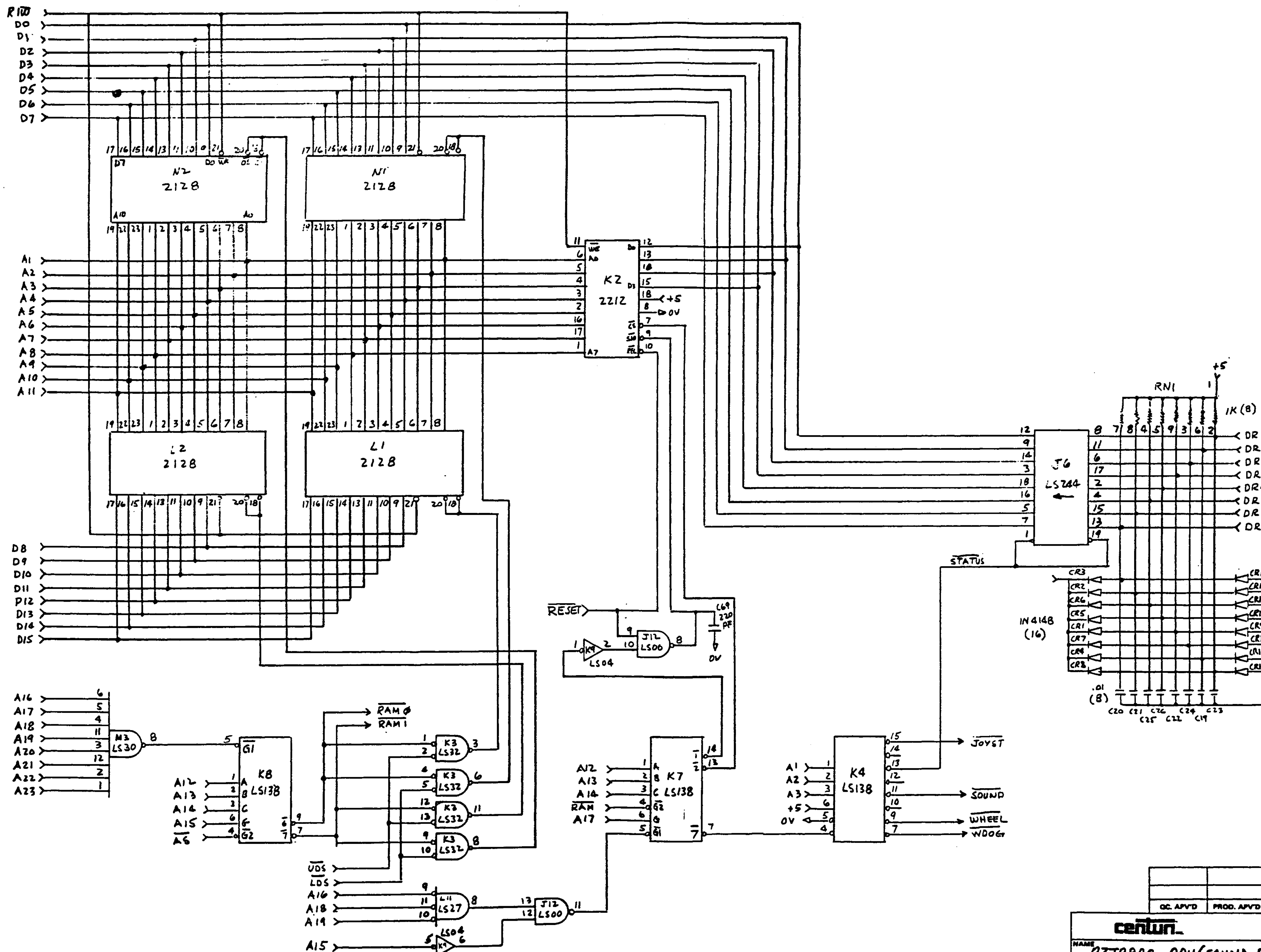
QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME AZTARAC CPU/SOUND BOARD

MATL'S. | HEAT TREAT. | FINISH

DWN. GAH | APP'D. | DATE 5-18-83 | SCALE | PART NO. 905-4902 | REV.



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

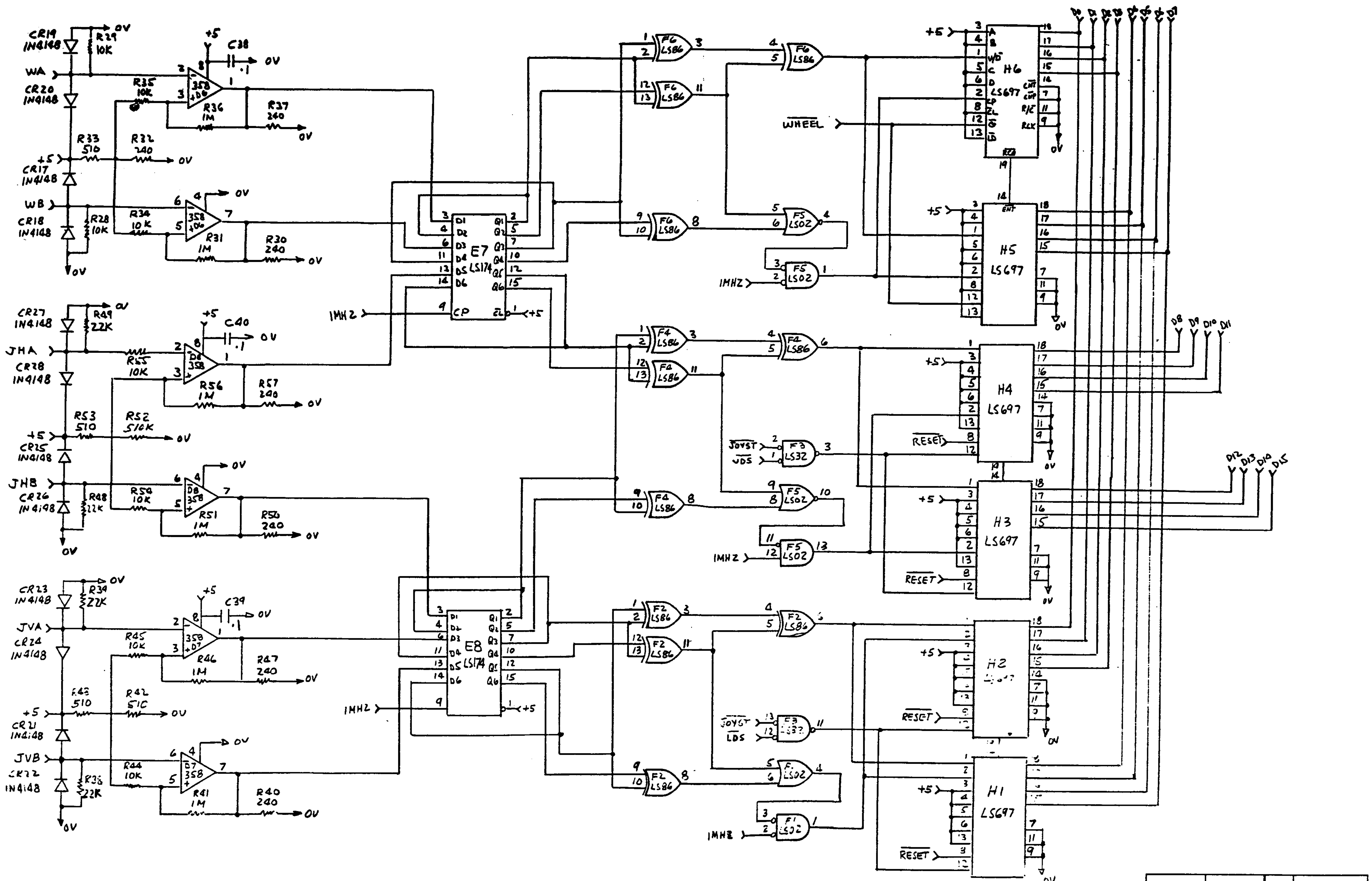
centuri — HIALEAH, FLORIDA 33014

NAME: AZTARAC CPU/SOUND BOARD

MATL'S. | HEAT TREAT. | FINISH

DWN. AAN | APPR. | DATE 5-19-83 | SCALE | PART NO. 905-4902 | REV.

PAGE 4 OF 7



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

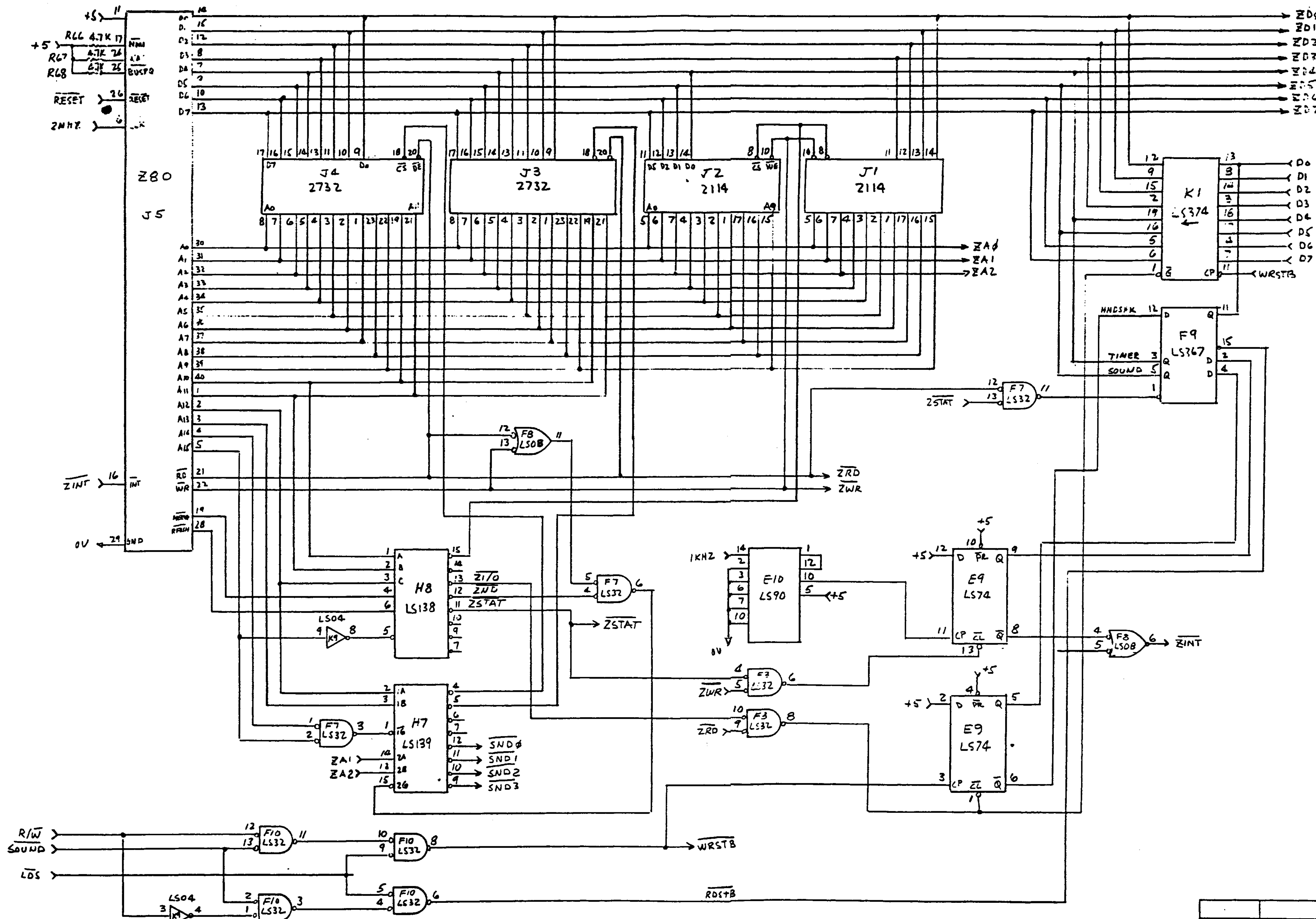
centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC CPU/SOUND BOARD

MATL'S. | HEAT TREAT. | FINISH

DWN. AAN | APV'D. | DATE 6-6-83 | SCALE | PART NO. 905-4902 | REV.

PAGE 5 OF 7



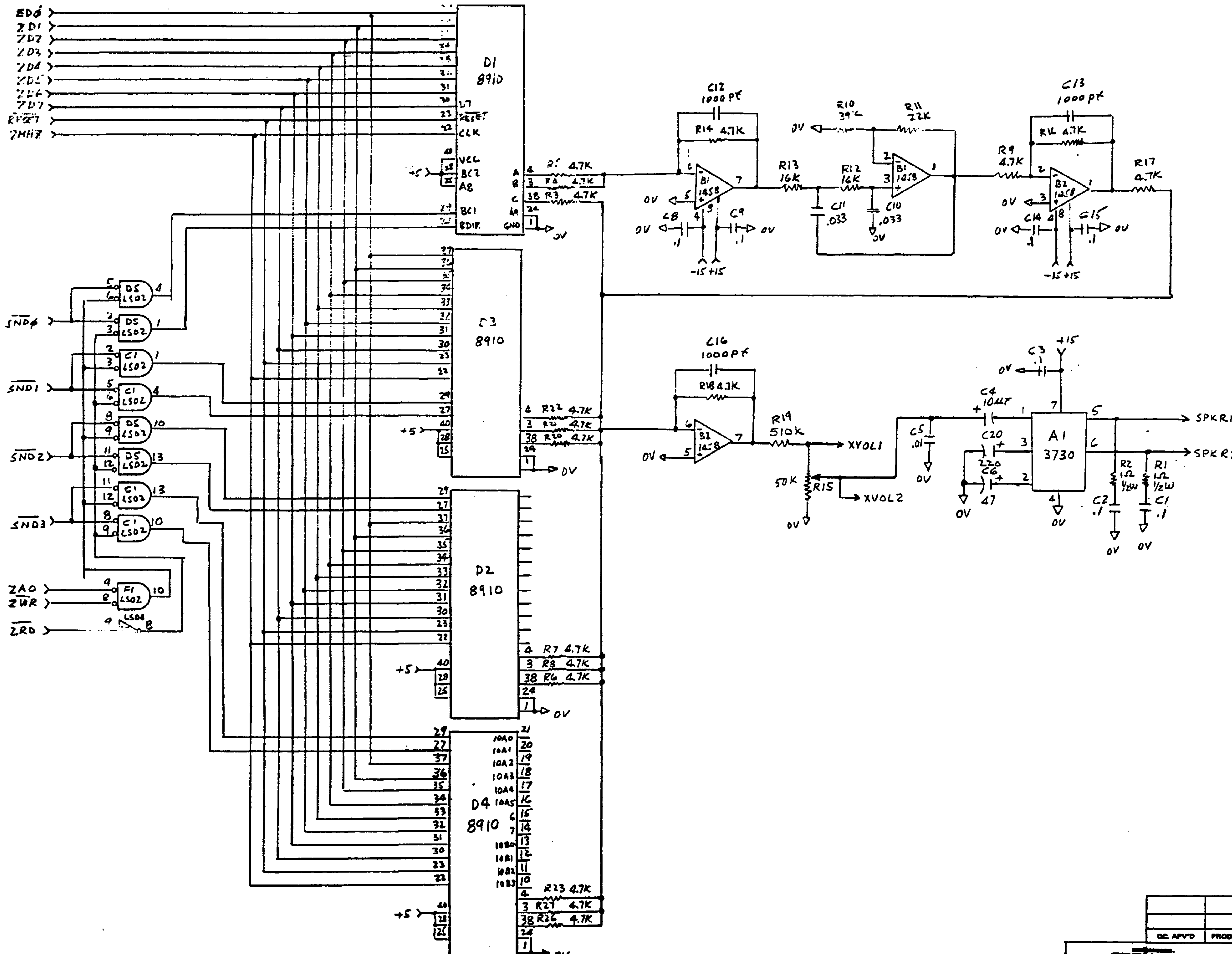
QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC CPU/SOUND BOARD

MAT'L: | HEAT TREAT. | FINISH

DWN. AAN | APV'D | DATE 6-6-83 | SCALE | PART NO. 905-4902 | REV.



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

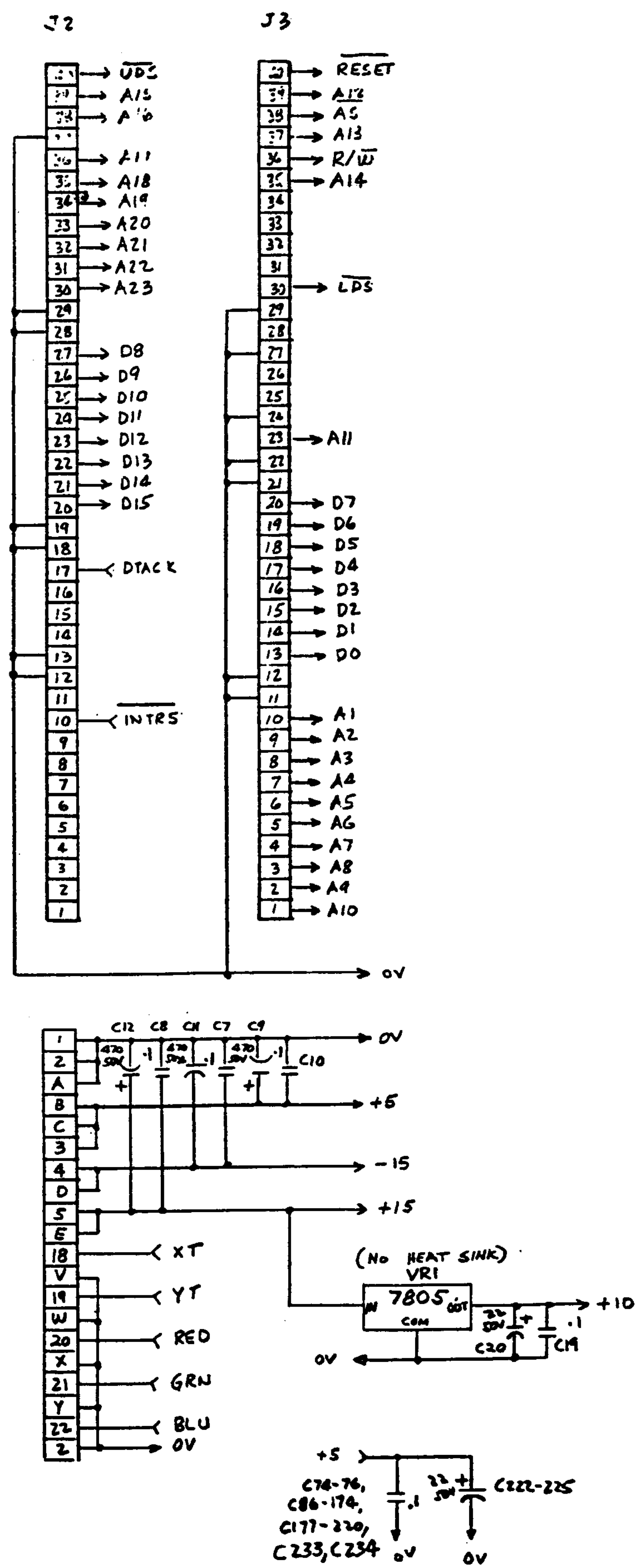
centuri HIALEAH, FLORIDA 33014

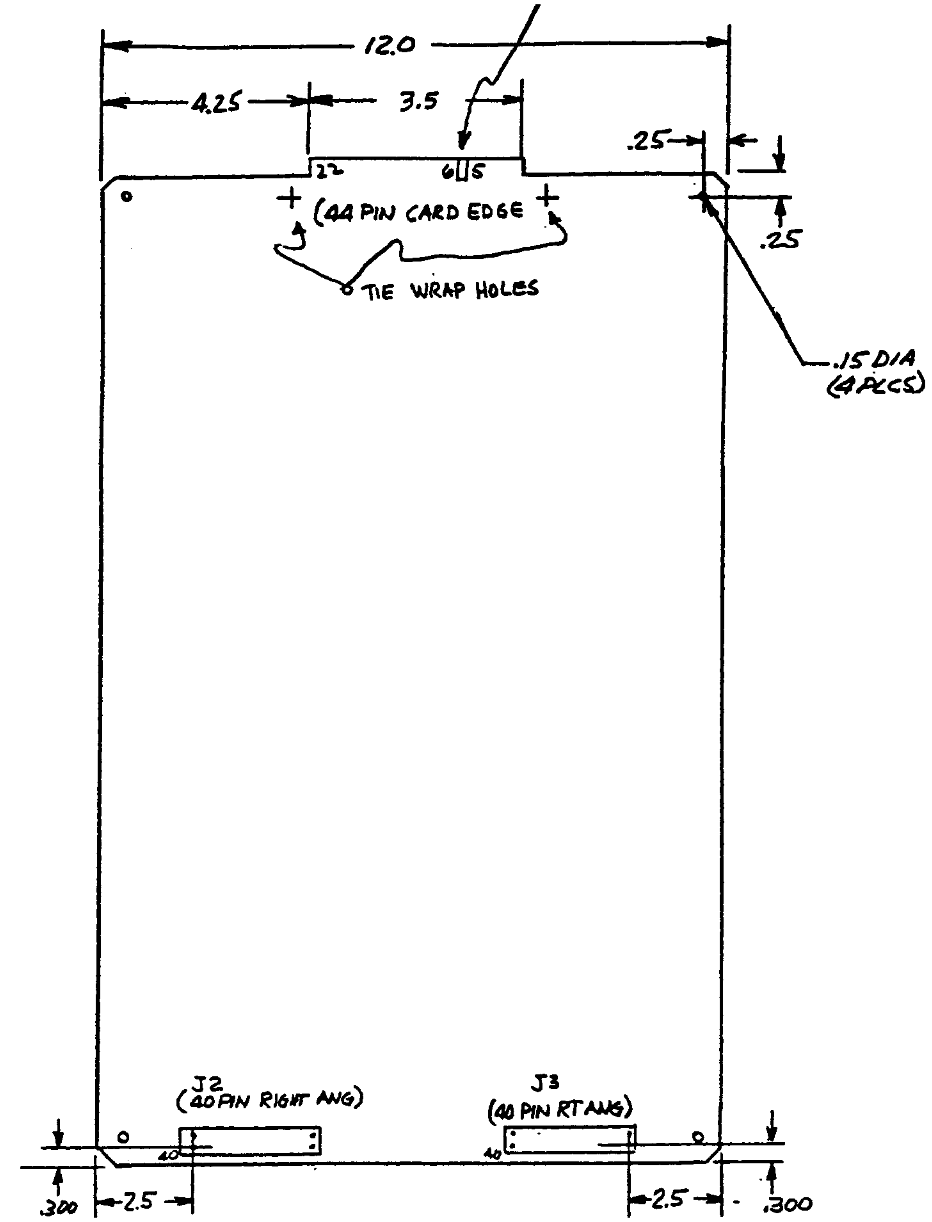
NAME: AZTARAC CPU/SOUND BOARD

MATL'S | HEAT TREAT. | FINISH

DWN. AAN | APV'D | DATE 6-8-83 | SCALE | PART NO. 905-4902 | REV.

PAGE 7 OF 7





BOARD OUTLINE COMPONENT SIDE SHOWN – (NOT TO SCALE)

Q.C. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO.

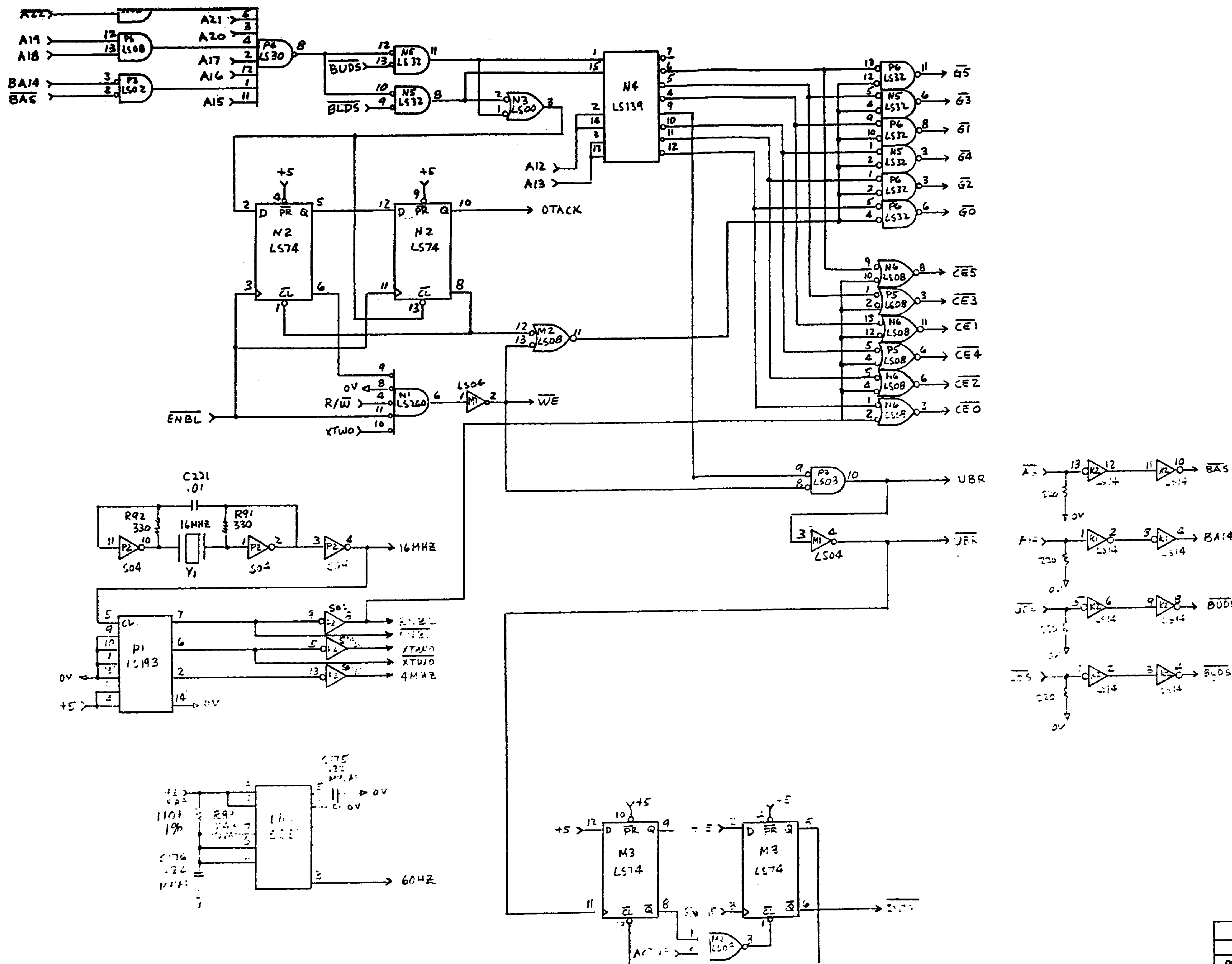
centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MAT'L	HEAT TREAT.	FINISH

DWN.	APPD.	DATE	SCALE	PART NO.	REV.
AAM		4-14-83	—	905-4901	A

PAGE 1 OF 10



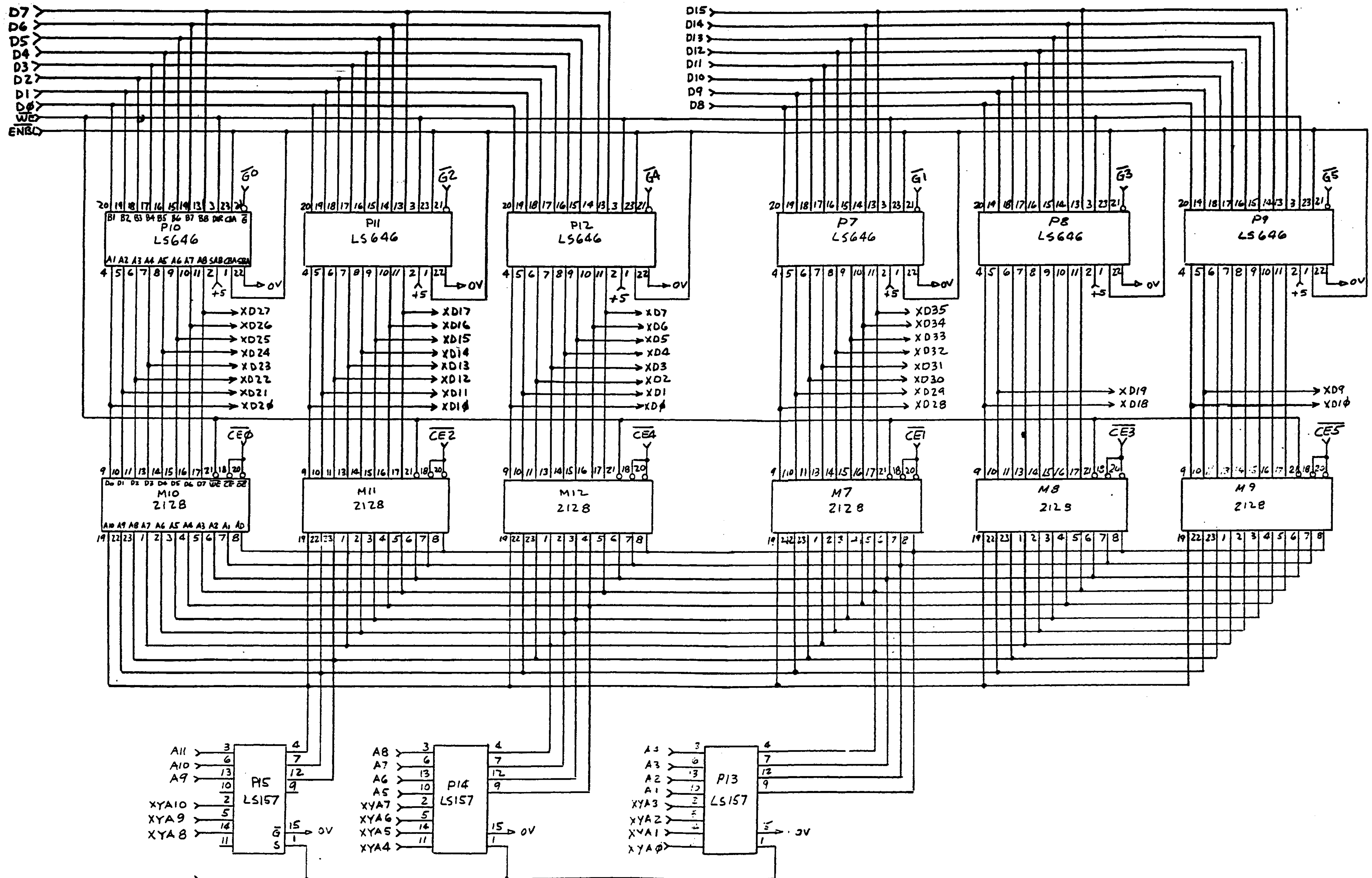
QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MAT'L'S.	HEAT TREAT.	FINISH

DWN.	APP'D	DATE	SCALE	PART NO.	REV.
AAN		4-15-83		905-4901	A



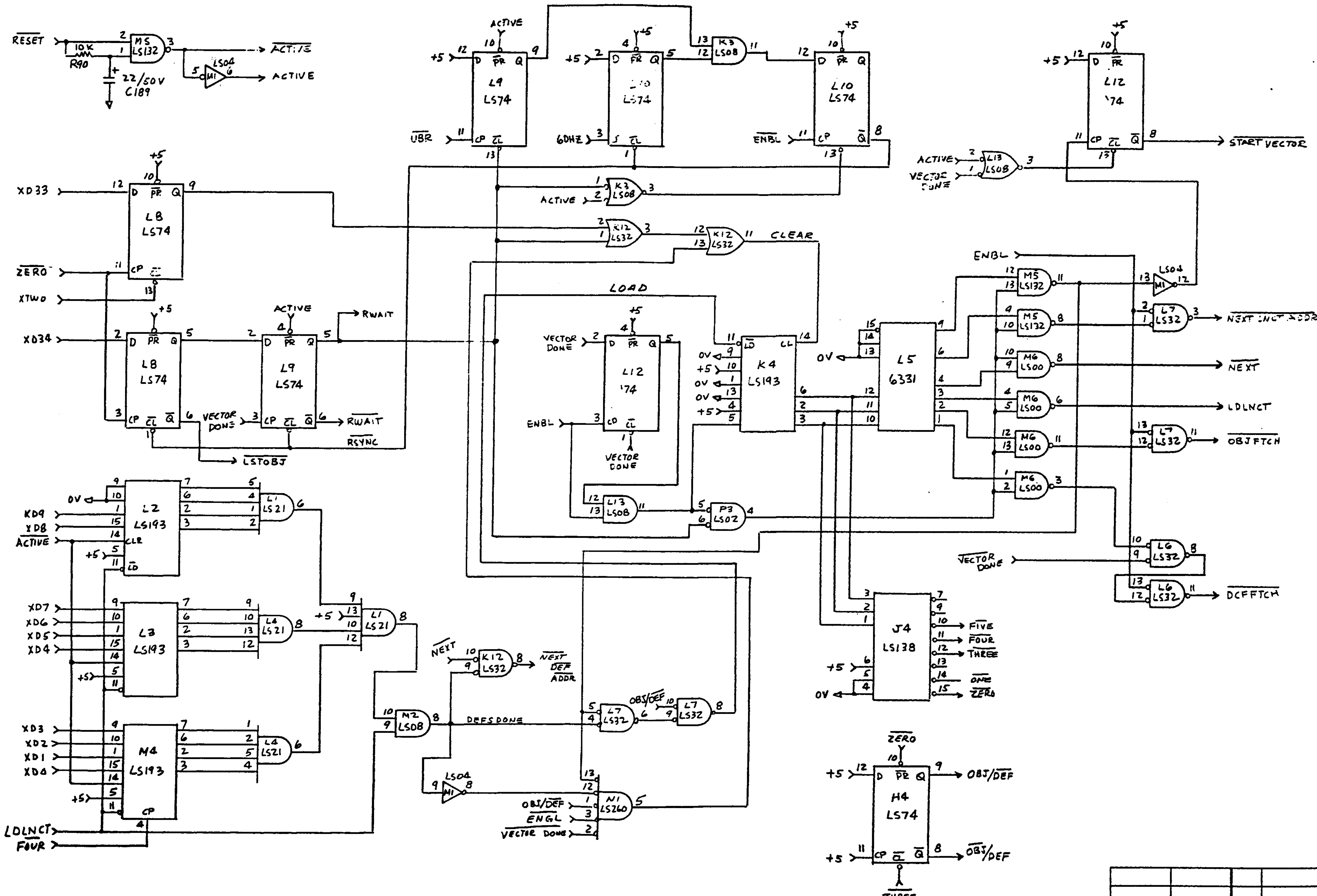
QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MATL'S. | HEAT TREAT. | FINISH

DWN. AAN | APP'D | DATE 4-12-83 | SCALE | PART NO. 905-4901 | REV. A



QC APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

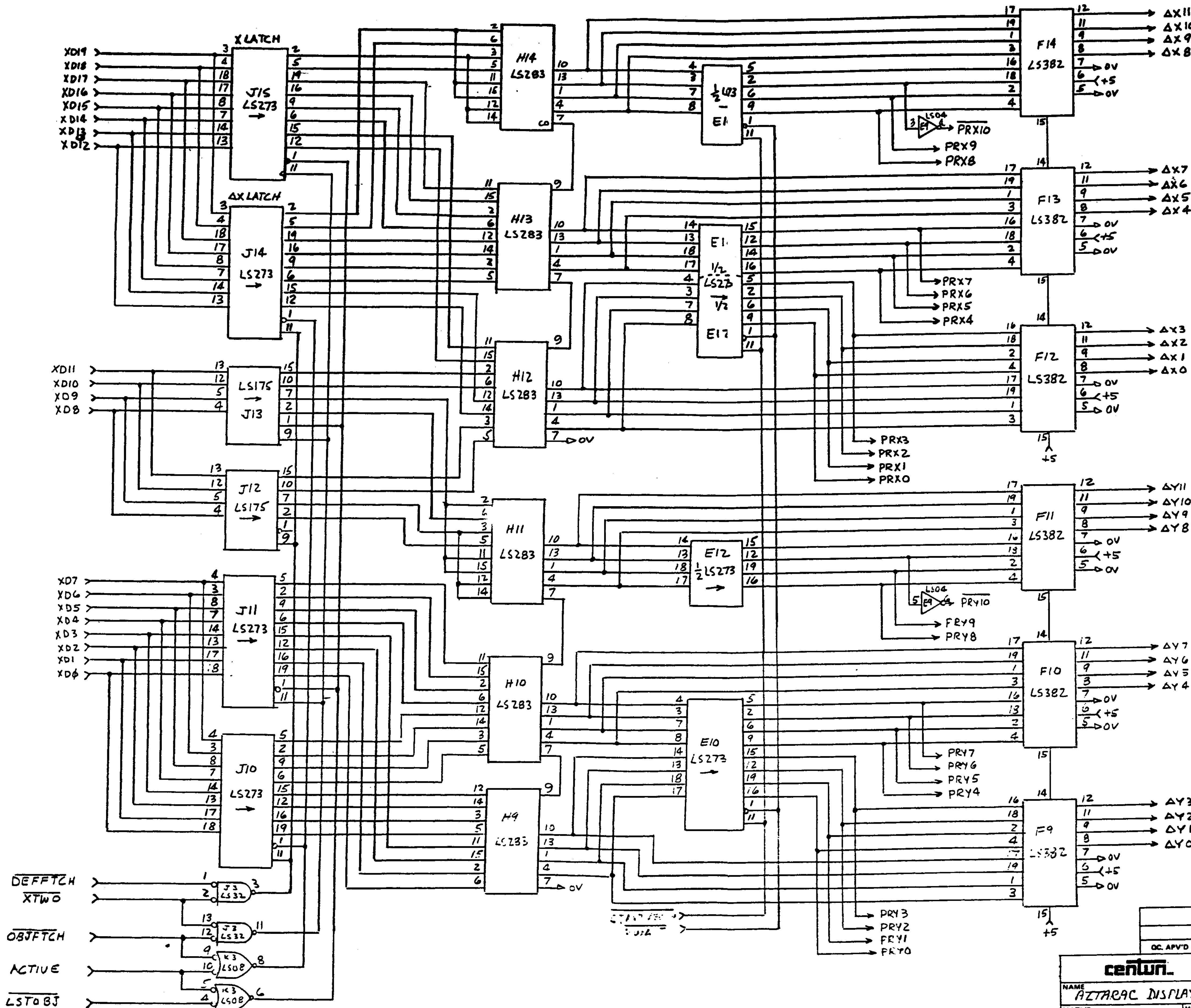
centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MAT'L	HEAT TREAT.	FINISH

DWN.	APPD.	DATE	SCALE	PART NO.	REV.
AAN		4-21-83		905-4901	A

PAGE 4 OF 10



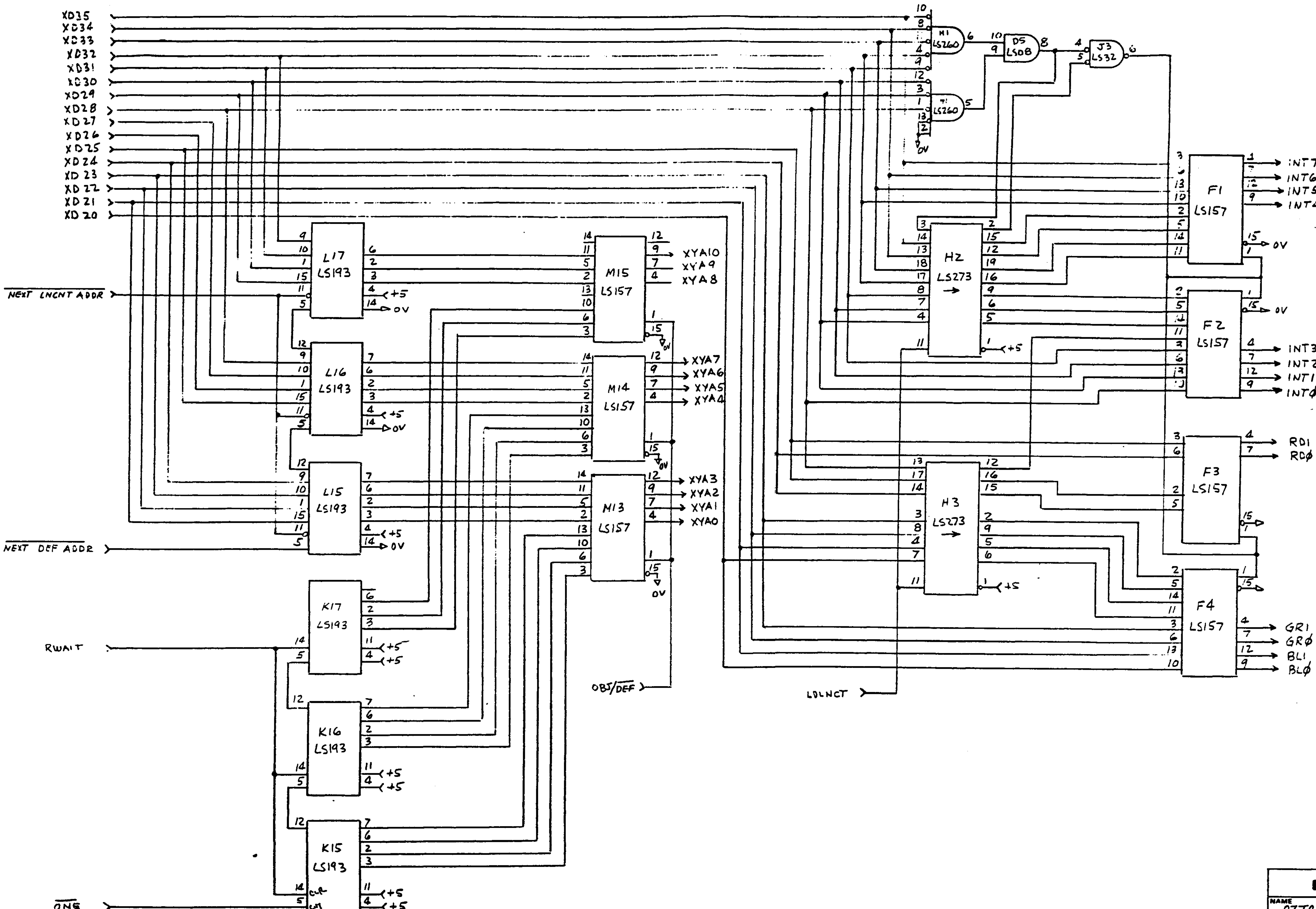
QC. APV'D | PROD. APV'D | QTY. | ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME AZTARAC DISPLAY BOARD SCHEMATIC

MATL'S. | HEAT TREAT. | FINISH

DWN. AAN | APP'D | DATE 4-21-83 | SCALE | PART NO. 905-4901 | REV. A



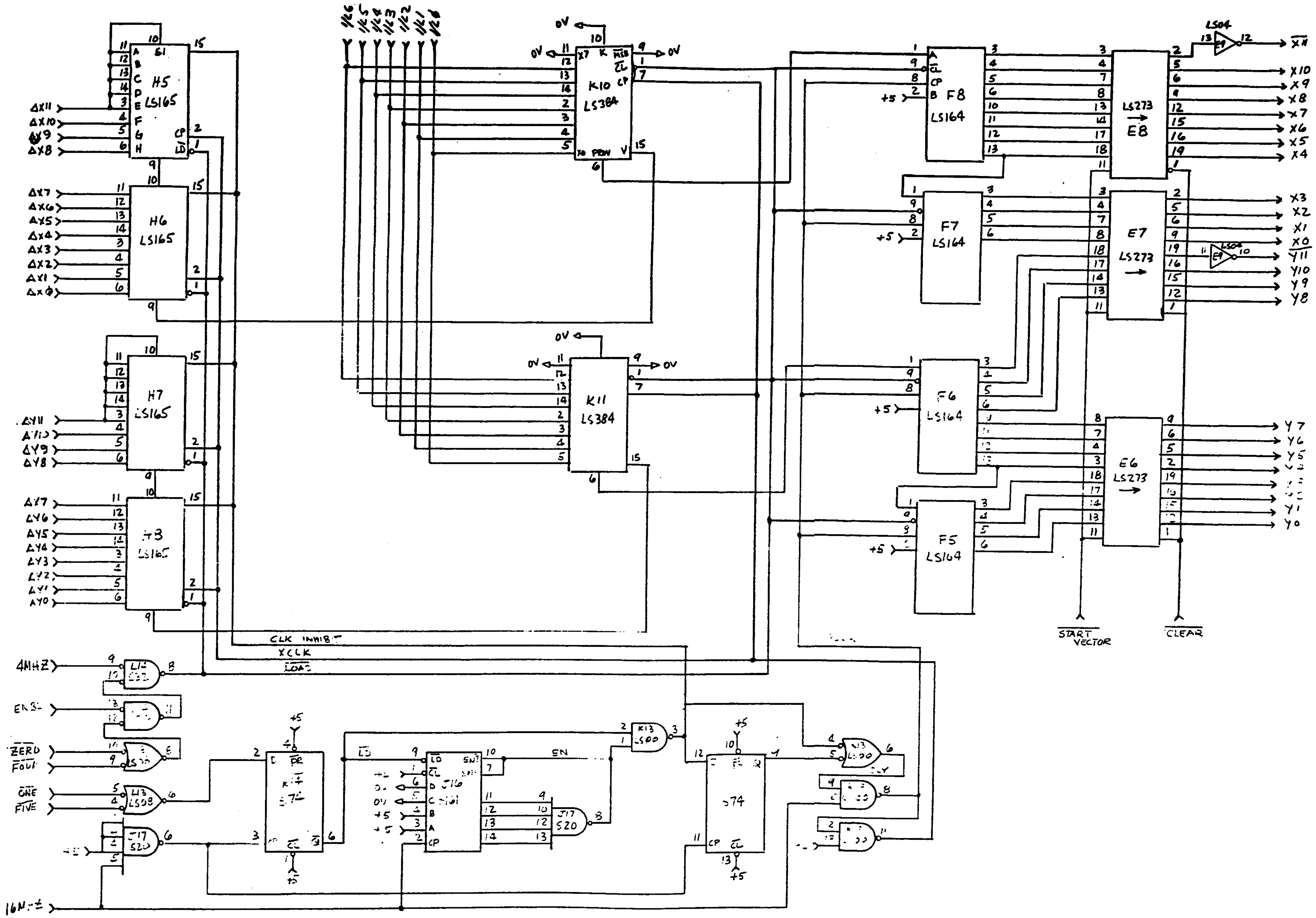
QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MATL'S. | HEAT TREAT. | FINISH

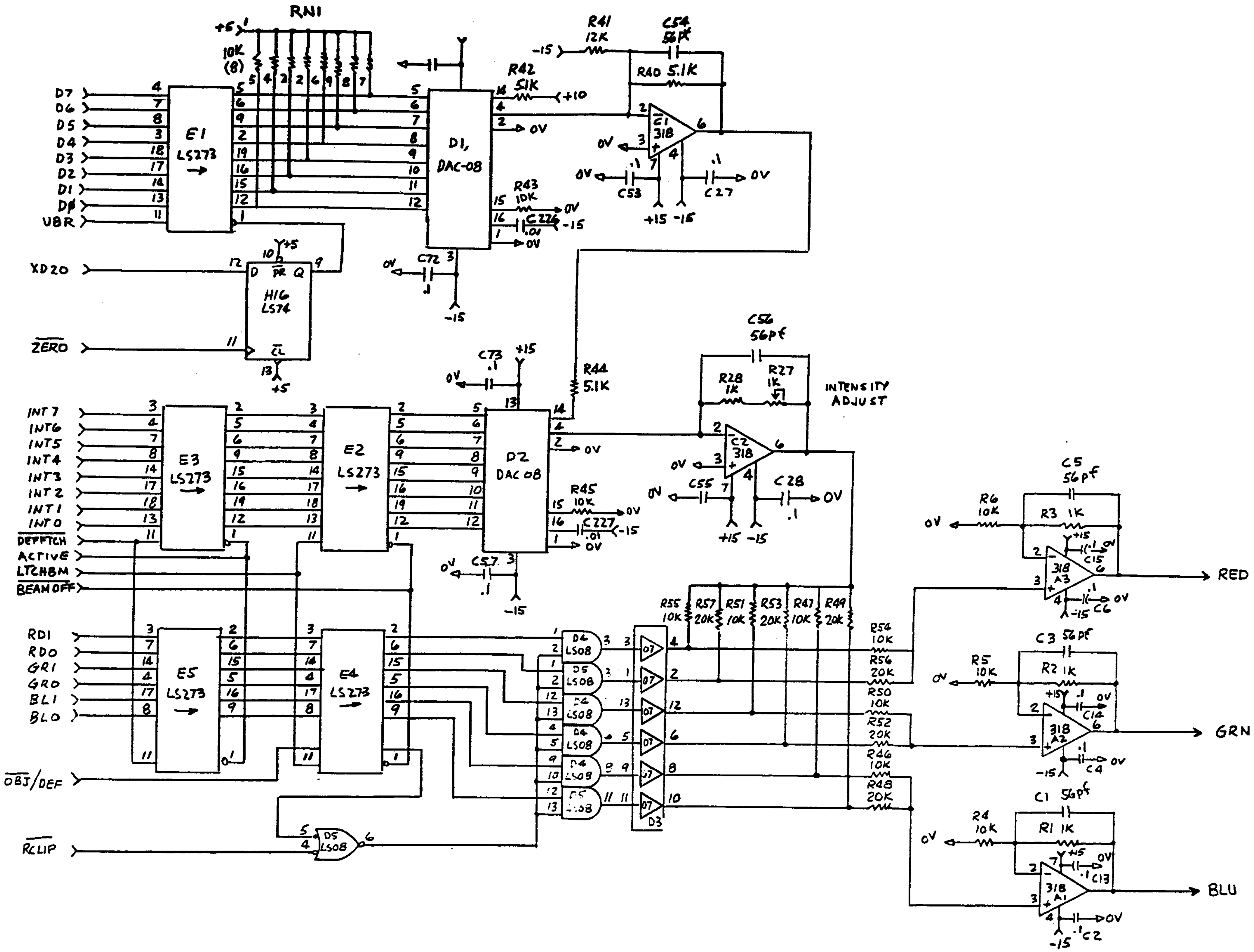
DWN.	APVD	DATE	SCALE	PART NO.	REV.
AAN		4-22-83		905-4901	A



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME ATTAPAC DISPLAY ... SCHEMATIC



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

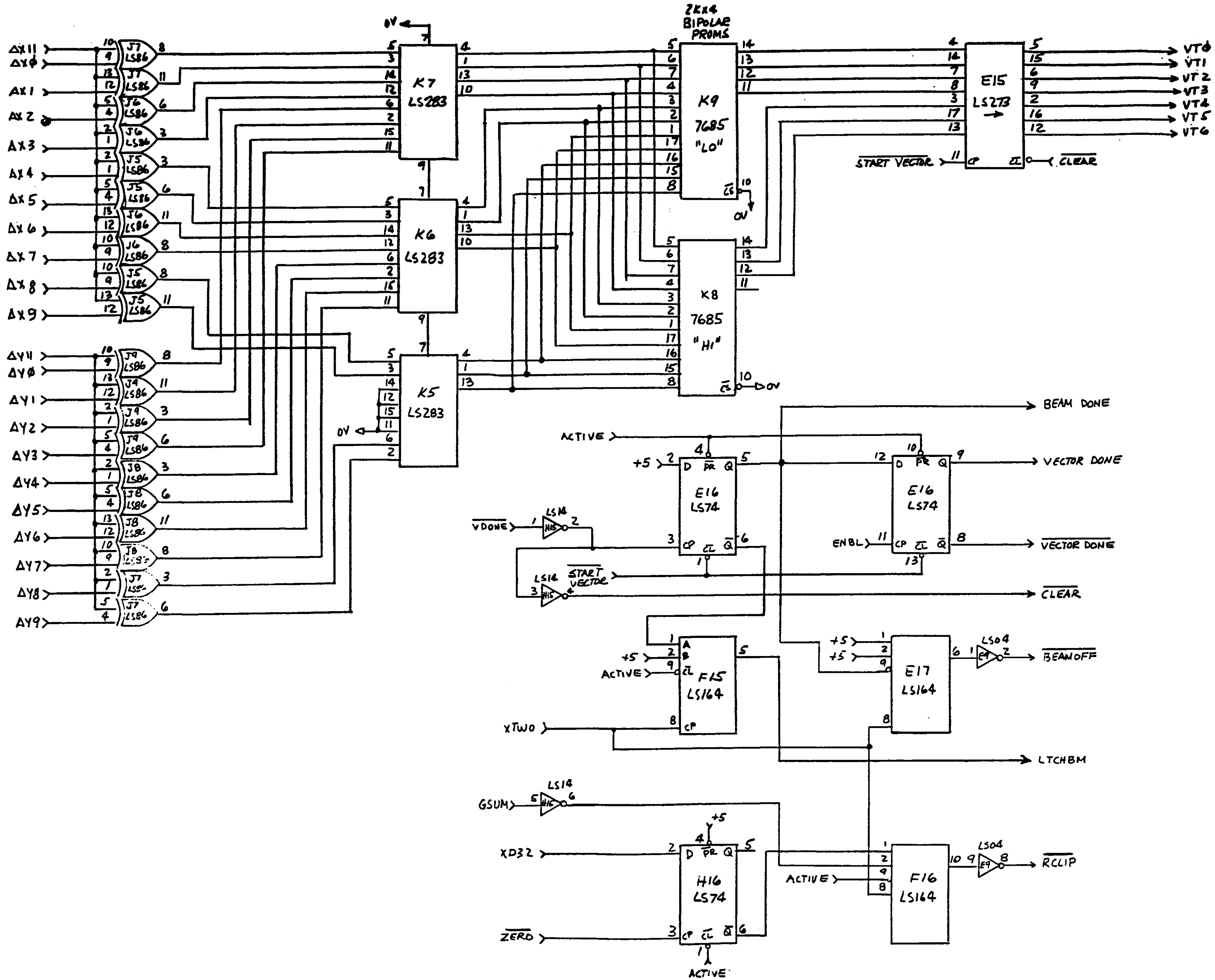
centuri — HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MAT'L	HEAT TREAT.	FINISH

DWN.	APPD.	DATE	SCALE	PART NO.	REV.
AAN	[illegible]	4-29-83		905-4901	A

PAGE 8 OF 10



QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

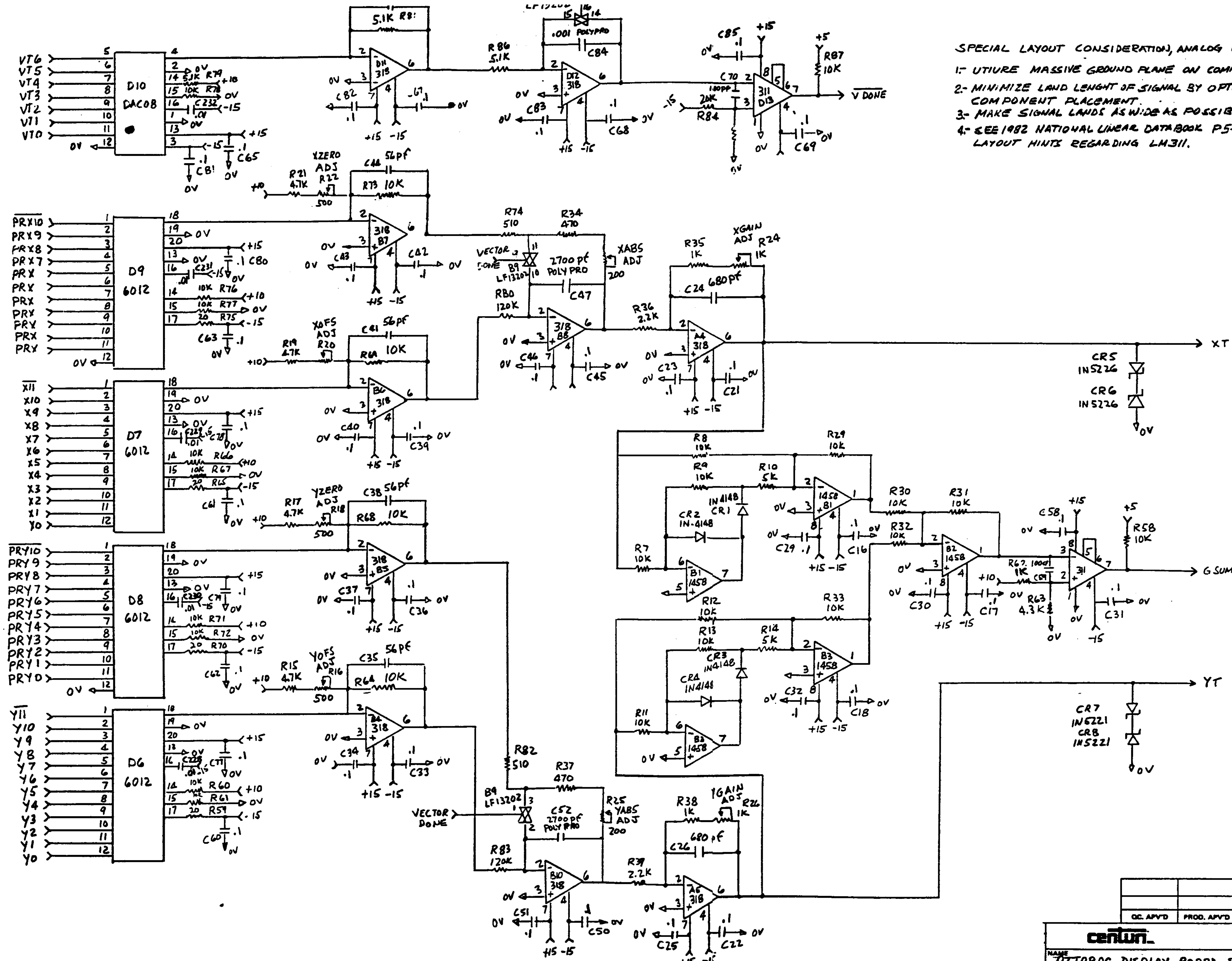
centuri HIALEAH, FLORIDA 33014

NAME: AZTARAC DISPLAY BOARD SCHEMATIC

MAT'L	HEAT TREAT.	FINISH

DWN.	APP'D	DATE	SCALE	PART NO.	REV.
AAN		5-2-83		905-4901	A

PAGE 9 OF 10



SPECIAL LAYOUT CONSIDERATION, ANALOG CIRCUITRY

1- UTIURE MASSIVE GROUND PLANE ON COMPONENT SIDE
2- MINIMIZE LAND LENGHT OF SIGNAL BY OPTIMAL COMPONENT PLACEMENT.
3- MAKE SIGNAL LANDS AS WIDE AS POSSIBLE
4- SEE 1982 NATIONAL LINEAR DATABOOK PS-54 FOR LAYOUT HINTS REGARDING LM311.

QC. APV'D	PROD. APV'D	QTY.	ASSEMBLY NO

centuri HIALEAH, FLORIDA 33014

NAME: ASTARAC DISPLAY BOARD SCHEMATIC

MATL'S | HEAT TREAT. | FINISH

DWN: AAN | DATE: 5-5-83 | PART NO.: 905-4901 | REV.: A